File: Hubert Wheeler State School

RECEIVED

JAN 19 1994

SPFD BRANCH

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

Hubert Wheeler
MO0000093666
1.5

1.18.94

January 18, 1994

Ms. Anne Olberding
Superfund Branch
Waste Management Division
U.S. Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, KS 66101

RE: Preliminary Assessment Project Report

Dear Ms. Olberding:

The Site Evaluation Unit has completed the preliminary assessment report for the Hubert Wheeler State School in the City of St. Louis, Missouri. This report was prepared in accordance with the guidelines for the Preliminary Assessment/Site Inspection components of the Hazard Ranking System. Copies of the report and the scoresheets for these sites are enclosed for your review. Tentative disposition forms are also enclosed for the site.

The Department intends to pursue further investigation on this site, possibly as a site inspection. The Hubert Wheeler State School is not designated for a site inspection in fiscal year 1994 in our current cooperative agreement. When the school's consultant finishes a site study, we will contact you with our plans for this site.

Please call if you have any questions or comments. The staff person most familiar with this site is Ms. Julie Bloss, who can be reached at (314) 751-3176.

Sincerely,

HAZARDOUS WASTE PROGRAM

James L. Kavanaugh

James L. Kavanaugh, Chief
Site Evaluation Unit
Superfund Section

JLK:kdo

Enclosures

RECYCLED PAPER

30803295
Superfund

REFERENCES

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: Hubert Wheeler State School **CERCLIS #:**

AKA: **SSID:**

ADDRESS: 5707 Wilson Avenue

CITY: St. Louis **STATE:** MO **ZIP CODE:** 63110-2797

SITE REFERENCE POINT: SE Corner of the School Building

USGS QUAD MAP NAME: Webster Groves, MO-IL **TOWNSHIP:** 45 N/S **RANGE:** 7 E/W

SCALE: 1:24,000 **MAP DATE:** 1954 Revised 68 & 74 **SECTION:** ___1/4 ___1/4 ___1/4

MAP DATUM: 1927 1983 (CIRCLE ONE) **MERIDIAN:** 5th Principle

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 90 ° 22 ' 30 " **LATITUDE:** 38 ° 30 ' 00 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 90 ° 17 ' 30 " **LATITUDE:** 38 ° 35 ' 00 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 81

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 26 . 76 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 ' 26 . 76 "

D) ADD TO STARTING LATITUDE: 38 ° 35 ' 00 . 00 " + 0 ' 26 . 76 =

SITE LATITUDE: 38 ° 35 ' 26 . 76 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 65

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 21 . 48 "

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 0 ' 21 . 48 "

D) ADD TO STARTING LONGITUDE: 90 ° 17 ' 30 . 00 " + 0 ' 21 . 48 =

SITE LONGITUDE: 90 ° 17 ' 51 . 48 "

INVESTIGATOR: Jerry L Foster **DATE:** 6/1/93

SITE NAME: Hubert Wheeler State School **NUMBER:**

TOPOGRAPHIC MAP QUADRANGLE NAME: Webster Groves, MO-IL **SCALE: 1:24,000**

COORDINATES OF LOWER RIGHT-HAND CORNER OF 2.5-MINUTE GRID:

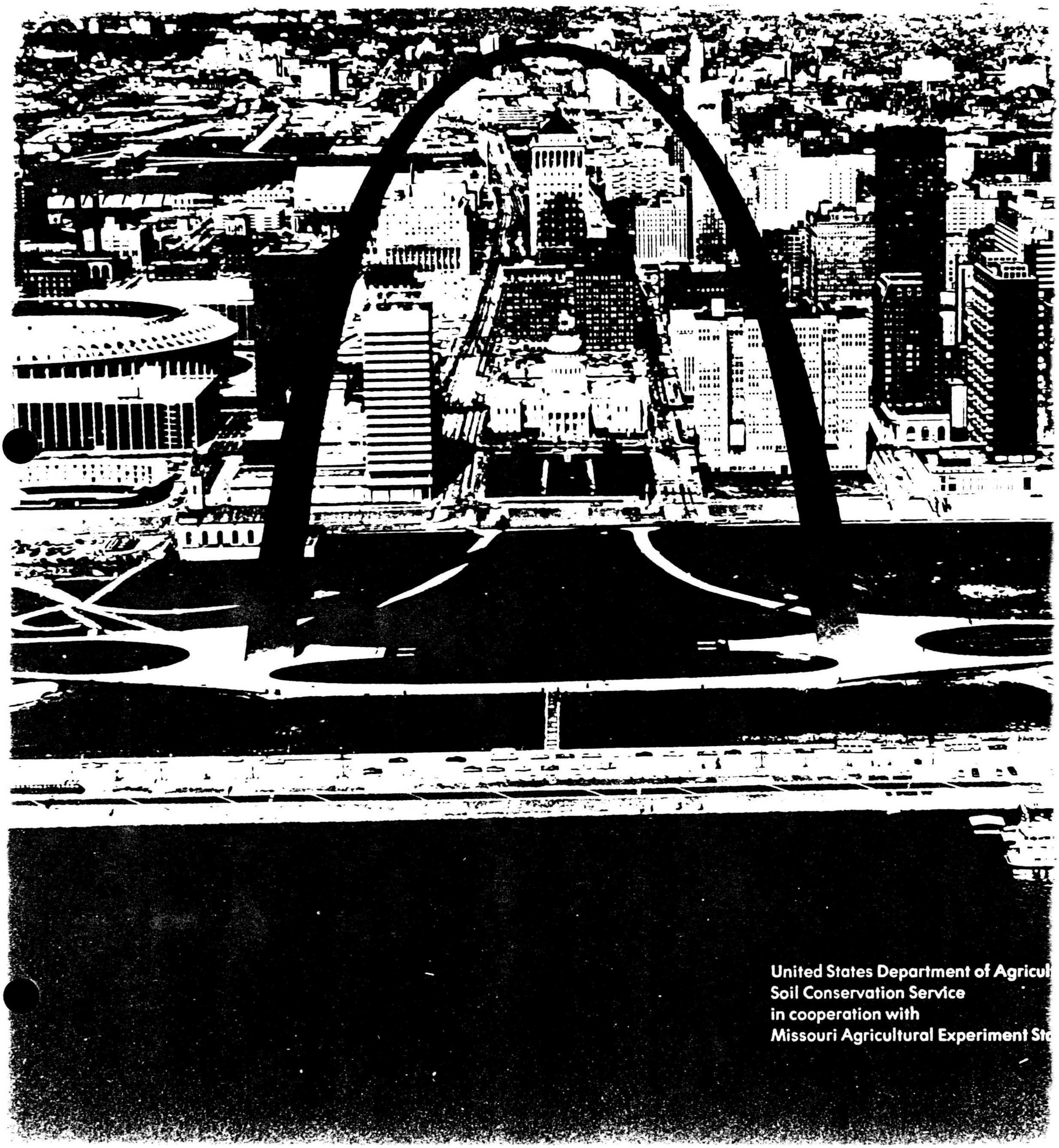
LATITUDE: 90 ° 17 ' 30 " **LONGITUDE:** 38 ° 35 ' 00 "

*U.S. GOVERNMENT PRINTING OFFICE: 1991-

Soil survey of

St. Louis County and St. Louis City, Missouri

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 6



United States Department of Agricul
Soil Conservation Service
in cooperation with
Missouri Agricultural Experiment St

Contents

soil series

Issued April 1982

soil survey of
St. Louis County and St. Louis City, Missouri

By Ken E. Benham, Soil Conservation Service

Fieldwork by Ken E. Benham, Soil Conservation Service, and Keith D. Biermann, Alan H. Donges, and G. M. Flieg, St. Louis County Soil and Water Conservation District

United States Department of Agriculture, Soil Conservation Service
in cooperation with
Missouri Agricultural Experiment Station

ST. LOUIS COUNTY AND ST. LOUIS CITY are on the eastern border of Missouri, nearly centered between the north and south state lines (fig. 1). The boundaries of St. Louis City and St. Louis County join, but they do not overlap. The city of St. Louis covers 65 square miles, and St. Louis County covers 517 square miles. The total area is 582 square miles, or 372,480 acres. Clayton, the county seat of St. Louis County, is in the east-central part of the county.

In 1970, the population of Clayton was about 16,000. The population of St. Louis County was about 952,000, and the population of the city of St. Louis was about 622,000 (*9*). The total population of the survey area was about 1,574,000. The trend since 1950 has been a declining population in the city of St. Louis and a rapidly increasing population in St. Louis County. The projected 1980 population is about 1,052,000 for St. Louis County and about 540,000 for the city of St. Louis (*18*).

The survey area is bordered on the east by the Mississippi River, on the north by the Missouri River, on the south by Jefferson County and the Meramec River, and on the west by Franklin County. Most of the urbanized eastern part of the survey area is nearly level to moderately sloping. Most of the relatively unurbanized western part of the survey area is moderately sloping to steep. A primary divide separates all but the eastern few miles of the survey area into two drainage systems. The northern part drains into the Missouri River, and the southern part drains into the Meramec River.

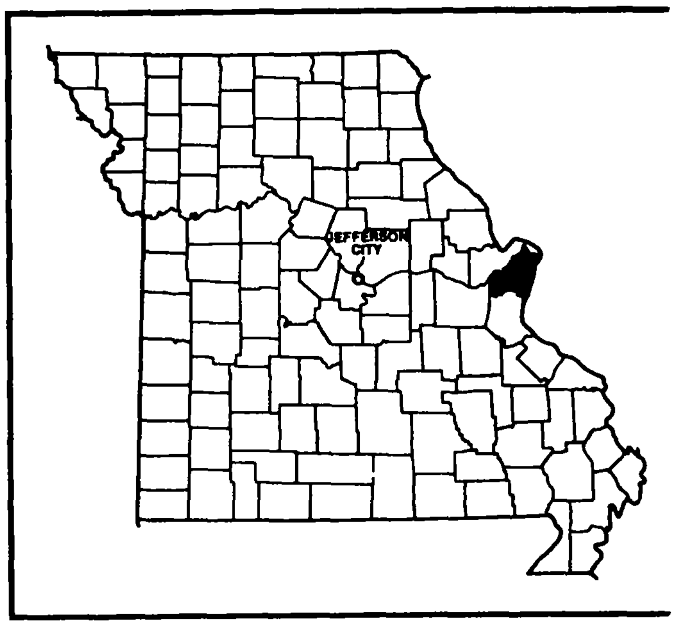


Figure 1.—Location of St. Louis County and St. Louis City in Missouri.

The survey area is dominantly urban. The economy of the area is based on manufacturing, retail business, and service facilities, such as food and recreation. Numerous large corporations are headquartered in St. Louis. Major auto manufacturers have assembly plants in the city or county.

Little farming is done on the upland, but most of the Missouri River and Meramec River bottoms and some of the tributary stream bottoms are used for cultivated crops. The major crops are soybeans, corn, and wheat. Smaller locally important crops are sod grasses and truck crops.

Soil scientists determined that there are about 24 different kinds of soil in the survey area. These soils range widely in texture, natural drainage, and other characteristics. Most soils on the uplands in the southern and southwestern parts of the survey area formed in residuum from cherty and chert-free limestone. Most of the remaining soils on the uplands formed in loess. Nearly all of the soils on uplands are used for urban development. Most of the soils on terraces and bottom lands are well suited to cultivated crops. The well drained to somewhat poorly drained soils on terraces are nearly level and gently sloping. The somewhat excessively drained to poorly drained soils on the flood plains are mainly nearly level.

An earlier soil survey of St. Louis County was published in 1923 (*19*). This present soil survey updates the first survey and provides additional interpretative information. It is on larger maps from aerial photography that show the soils in greater detail.

general nature of the survey area

This section gives general information about the survey area. Climate, history and development, and transportation are discussed.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

The consistent pattern of climate in St. Louis county is cold winters and long, hot summers. Heavy rains occur mainly in spring and early in summer, when moist air from the Gulf of Mexico interacts with drier continental air. The annual rainfall is normally adequate for corn, soybeans, and small grain.

Table 1 gives data on temperature and precipitation for the survey area as recorded at St. Louis in the period 1951 to 1976. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 33 degrees F, and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred at St. Louis on January 23, 1963, is -11 degrees. In summer the average temperature is 77 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at St. Louis on July 14, 1954, is 115 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 33.8 inches. Of this, 20 inches, or 60 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 16 inches. The heaviest 1-day rainfall during the period of record was 3.95 inches at St. Louis on June 14, 1957. Thunderstorms occur on about 50 days each year, and most occur in summer.

Average seasonal snowfall is 18 inches. The greatest snow depth at any one time during the period of record was 12 inches. On an average of 9 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 12 miles per hour, in March.

history and development

The Mississippi River was the most important influence on the early development of the St. Louis area. It gave explorers and settlers access to the middle part of the continent. In 1541, just 50 years after the discovery of the new world by Columbus, Hernando De Soto discovered the Mississippi River and claimed the territory that extended northward from the mouth of the river for Spain (*7*). Probably the first Europeans to visit the confluence of the Missouri and Mississippi Rivers were two young Frenchmen, Radisson and Groseilliers, in 1654 or 1655 (*3*). The travels of Father Jacques Marquette and Louis Joliet down the Mississippi River in 1673 are much better chronicled. Shortly after this, numerous trappers and hunters began traversing the area. They encountered, at one time or another, Indians from a number of tribes, including the Pottawatomie, Miami, Kickapoo, Delaware, Shawnee, Iowa, Sauk and Fox, Illini, Osage, and Missouri. A large number of tribes used the area because the Missouri and Mississippi Rivers were primary transportation routes.

In 1682, Sieur de la Salle traveled past the St. Louis area and claimed the territory for France. It was more than 80 years before the first permanent French settlement was established on the west side of the Mississippi River. Auguste Chouteau and Pierre Linquest

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MISSOURI AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

ST. LOUIS COUNTY AND ST. LOUIS CITY, MISSOURI

Scale 1: 253,440

1 0 1 2 3 4 Miles

1 0 1 2 3 4 5 6 Kilometers

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL LEGEND

- 1 — Blake-Eudora-Waldron association: Nearly level, somewhat poorly drained and well drai formed in alluvial sediment; on flood plains
- 2 — Wilbur-Haymond-Elsah association: Nearly level and gently sloping, moderately well dra what excessively drained, deep soils formed in alluvial sediment; on flood plains
- Freeburg-Ashton-Weller association: Nearly level and gently sloping, somewhat poorly dr drained, deep soils formed in loess and alluvial sediment; on terraces
- Menfro-Winfield-Urban land association: Gently sloping to very steep, well drained and well drained, deep soils formed in loess, and Urban land; on uplands
- Nevin-Urban land association: Nearly level, somewhat poorly drained, deep soils formed lacustrine sediment, and Urban land; on depressional uplands
- 6 — Urban land-Harvester-Fishpot association: Urban land and nearly level to moderately ste well drained and somewhat poorly drained, deep soils formed in silty fill material, loess, on uplands, terraces, and bottom lands
- 7 — Goss-Gasconade-Menfro association: Moderately sloping to very steep, well drained and cessively drained, deep and shallow soils formed in limestone residuum and loess; on up

Compiled 1981

GEOTECHNOLOGY
ENGINEERING AND ENVIRONMENTAL SERV
SAINT LOUIS • KANSAS CITY

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 7

November 30, 1993

2498.01.3120.01

Mr. Gerald Bonnot
Division of Design and Construction
State of Missouri - Office of Administration
P.O. Box 809
Jefferson City, Missouri 65102

RECEIVED
DEC 9 1993
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Reference: Final Report - Playground Site Restoration
Hubert Wheeler State School
5707 Wilson Avenue, St. Louis, Missouri
Project Number 05-523-93-0001(A)
Account Numbers 307-74536-1232 And 307-72876-0992

Dear Mr. Bonnot:

Enclosed are two copies of the final report for the Subsurface Assessment conducted for the above-referenced site. Also enclosed for your records are copies of the disposal permits and the special waste manifest applicable to the disposal of decontamination rinsate water and the excess drill cuttings generated during the assessment; the special wastes were disposed on October 22, 1993.

In accordance with your phone conversation with Mr. Sam Brenneke on November 23, 1993, the enumerated review requirements presented in your letter of November 17, 1993, are addressed below:

Item 1 - Project and Account Numbers to be included with final report. We have revised the title of the final report to reflect Division of Design and Construction Project and Account Numbers.

Item 2 - Compounds and metals of concern to be discussed in the final report. This item is addressed in Section 3.0 - Results, Section 4.0 - Conclusions, Table 3 - Estimated Soil Action Levels, and Appendix D - Risk-Based Action Level Calculations. In summary, the final determination as to whether or not the concentration of a specific compound or metal will require additional investigation or clean-up, will be made by the Missouri Department of Natural Resources. Cleanup levels, or concentration levels of specific compounds or metals which would automatically trigger remedial response have not been established. Regulatory cleanup standards and/or action levels which trigger additional investigation or remediation are typically site specific and vary from site to site based on

2258 GRISSOM DRIVE • SAINT LOUIS, MISSOURI 63146 • 314 / 997-7440 • FAX: 314 / 997-2067

current use of the site and the potential for exposure to the public and damage to the environment. However, in the absence of established, site-specific regulatory action levels, estimated action levels can be established based on previously promulgated standards, on data developed by the USEPA to develop quantitative risk assessment values, and on risk based health standards previously established by various Health or Environmental Regulatory agencies. Based on this information, we have estimated likely action levels for those compounds which were detected at the highest concentrations during the assessment. The maximum concentration of the compound detected at the site and the estimated likely regulatory cleanup standard or action level for that compound is presented in Table 3 of the report. While additional cleanup standards or action levels may be established by the MDNR for additional compounds detected during the assessment, we believe those compounds which were detected at the highest concentration, will ultimately serve as indicator parameters in determining the need for additional assessment or remediation.

Item 3 - Additional investigation and exploratory excavation to be combined. We are in general agreement with this approach to additional investigations at the site. However, based on the information obtained during the assessment, the total extent of soil contamination has not been defined and additional sources of contamination, other than those previously removed from the site, may be present. We do not believe that the limited exploratory excavation proposed in the vicinity of former removal actions, would be beneficial at this time. We have recommended that a geophysical survey (i.e. Magnetometer/Gradiometer survey) be conducted at the site. The purpose of the magnetometer/gradiometer survey would be to identify magnetic anomalies indicative of buried metal and/or drums and to plot the locations of potential drum burial locations on a site plan. The information obtained from the previous assessment and the Magnetometer/gradiometer survey could then be used to develop a detailed remedial investigation plan which would include exploratory excavations, if needed, and additional soil sampling to identify the vertical and horizontal extent of soil contamination. The remedial investigation plan would be submitted to the MDNR prior to implementation, to obtain regulatory concurrence with planned investigations and to establish cleanup objectives for the site. The ultimate goal of the remedial investigation would be to obtain the information necessary to identify if remediation is required, and if required, to develop remedial alternatives or solutions and remedial cost estimates.

Item 4 - Submittal of Final Report to the Missouri Department of Natural Resources. We are prepared to submit a copy of the final report to the Missouri Department of Natural Resources. A copy of the cover letter which will accompany the report is attached for your review. We will delay submittal of the report to the MDNR for 10 days, to allow additional review and comment by the Division of Design and Construction prior to submittal.

Item 5 - Submittal of Final Report to Ron Littich of the Department of Elementary and Secondary Education. A copy of this letter has been submitted to Mr. Littich along with a copy of the final assessment report.

We appreciate the opportunity to be of service to you and trust this is the information your require. If you have any questions, please do not hesitate to contact me.

Yours very truly,

GEOTECHNOLOGY, INC.

Ed D. Alizadeh, P.E.
Principal

SLB/EDA:slb/tlp/mls

Enclosures: Cover Letter for Submittal of Final Report to MDNR
Decontamination Rinsate Water Disposal Permit (Metropolitan Sewer District)
Excess Drill Cuttings Special Waste Disposal Permit (St. Louis County)
Excess Drill Cuttings Special Waste Manifest (Browning Ferris Industries)
2 Copies - Final Report, Project Number 05-523-93-0001(A)

cc: Mr. Ronald Littich, Director of Facilities
Missouri Department of Secondary and Elementary Education

St. Louis Sewer
District

Department of Environmental Compliance
10 East Grand Avenue
St. Louis, MO 63147-2913
(314) 436-8710
FAX (314) 436-8753

October 12, 1993

Mr. Sam Brenneke
GEOTECHNOLOGY, INC.
2258 Grissom Drive
St. Louis, MO 63146

Dear Mr. Brenneke:

We have reviewed your application dated September 29, 1993 requesting approval to discharge 110 gallons of wastewater to the Metropolitan St. Louis Sewer District for treatment. This wastewater is from cleaning and decontamination of well drilling and sampling equipment at Hubert Wheeler State School, 5707 Wilson Avenue, St. Louis, Missouri.

Based on the analytical results, this wastewater meets MSD Ordinance 8472 standards and is approved for discharge into a <u>sanitary</u> sewer on site. The discharge into the sewer must be controlled at a rate that will not surcharge the lines in that area. This approval is valid for 30 days from the date of this letter.

You must be certain the waste is discharged into a <u>sanitary</u> or combined sewer inlet only. This letter does not authorize any discharge to a separate storm sewer, or to any watercourse, as any such discharge would be in violation of state and federal laws.

This discharge has been approved based upon the information and sample analyses you provided, and is subject to the conditions stated above. This approval may be revoked by the District at any time if any of the information is found to be incorrect, or if the conditions of this approval are violated. Also, if the discharge causes any operational or maintenance problem within the District's collection or treatment system, or results in violations of any conditions of the District's NPDES permit, Missouri Department of Elementary and Secondary Education will be considered responsible for damages.

If you have any questions, please call me at 436-8757.

Sincerely,
METROPOLITAN ST. LOUIS SEWER DISTRICT

Michael Townley

Michael Townley
Civil Engineer

jf
pc Bernie Rains
Ronald Littich, Director of Facilities
Missouri Department of Elementary and Secondary Education

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WASTE MANAGEMENT
DOCHMC-ENV
COMMUNITY HEALTH SERVICES

C USE ONLY	
Special Wast.	1748
Special Waste Registration No.	1748S-A940

RECEIVED

OCT 16 1993

GEOLOGY

ST. LOUIS COUNTY
APPLICATION FOR DISPOSAL OF SPECIAL WASTE

:e undersigned is applying for authorization to dispose of Special Waste in St. Louis County as provided by Chapter 607, Section 860, 1987

.IPORTANT: Application must be completed in full (Do not leave any sections blank) and accompanied by Missouri Department of Natural :esource's Special Waste Approval.

:enerator (To Be Completed By Generator)

Company / Individual Missouri Department of Elementary & Secondary Education

Mailing Address P.O. Box 480

City, State, Zip Jefferson City, Missouri 65102

Contact Person Ronald Littich Telephone (314) 751-8296

:eneration Rate (To Be Completed By Generator)

One Time Disposal 2-1,000 cu. yds.

Periodic / Continuous —— cu. yds. per —— (mo., yr.)

/aste Information (To Be Completed By Generator)

Waste Description Soils contaminated with coal tar

Location of generated waste Hubert Wheeler School, 5707 Wilson Ave., St. Louis, MO 63110

Briefly describe the process by which this waste is generated. Enclose a process flow chart if available. Waste consists of drill cuttings generated during sampling of coal tar contaminated soils.

:hysical Characteristics (Color, Odor, Consistency, etc.) Reddish brown color, no odor, solid

Chemical Characteristics (Attach a completed copy of the Missouri Department of Natural Resources Special Waste Disposal Request if applicable and laboratory analyses performed). See attached analytical

For neutralized infectious and hazardous, describe the method(s) of neutralization: (i.e., autoclaving, incineration, etc.). N/A

Name of neutralization company if different from generator. N/A

For neutralized infectious and hazardous waste, please describe the quality control safeguard(s) used including indicator(s): (i.e., time/temp. charts, bacillus stearothermophilus spore assay, chamber retention times and temps., etc). N/A

Transportation (To Be Completed By Generator)

Waste Hauling Company Browning Ferris Industries

Mailing Address 11432 Bowling Green Drive

City, State, Zip Maryland Heights, MO 63146

Contact Person Stacy Hillis Telephone (314) 567-3330

County Hauling Vehicle Permit Number(s) 4352 thru 4367

County Hauling Container Permit Number(s) 3301 thru 3500

Disposal (To Be Completed By Disposal Facility)

Vaste loads shall be individually recorded at the disposal facility. St. Louis County's approval is contingent upon the disposal facility's greement to accept this Special Waste.

Disposal Facility Browning Ferris Industries MO-Pass Landfill

Contact Person Mitch Stepro

Form SWD-2

1001931337C01 86CHECK $50.00

5

TRUCK NO. 463 TIME 12:00 ☐ A.M. ☑ P.M. DATE 10-22 19 93

NAME: HerberT Wheeler STATE School

ADDRESS: 5707 WILSON

NUMBER OF CONTAINERS DUMPED 1 SIZE 20 ☑ LOOSE ☐ PACKED ☐ LIQUID DRUMS ☐ SLUDGE

SERVICE TICKET
492745

10/85

RECPT REQ.

COD:

AUTO/MANUAL: ☐ (A/M)

ACCT. NO:

LOC. CODE:

SERV. DATE: 10 - 22 - 93

TRANS CODE:

TRANS DESC: MANifest # ~~[illegible]~~ 1020474

SYS CODE:

RTE:

NBR OF HAULS:

CONT SIZE:

VOL CODE:

COMP:

ON CALL:

HAUL CHRG:

DISP CHRG:

OTHER CHRG:

LF CODE:

DISP VOL:

VOL CODE:

CUST RECEIPT#:

SERV. TYPE:

TRUCK NBR: 463

SERV TIME: (MINS)

HAUL EQUIV:

DRIVER NBR:

BFI

CUSTOMER SIGNATURE: [signature]

DRIVER SIGNATURE: Richard Wilson

BFI 260-416

6

BFI Waste Systems™
BROWNING-FERRIS INDUSTRIES

No. 1020474

NON-HAZARDOUS SPECIAL WASTE MANIFEST

GENERATOR

Generator Name: Mo. Dept. of Elementary & Secondary Education
Generating Location: Hubert Wheeler State School

Address: P.O. Box 480
Jefferson City, Mo. 65102
Address: 5707 Wilson Ave.
St. Louis, Mo.

Phone No.: 314 - 751 8296
Phone No.: 314 - 645 4710

BFI Waste Code: MO 738 941005 210153

Description of Waste	Quantity	Units	Containers No.	Containers Type
Non-Hazardous Coal Tar Contaminated Soil St. Louis County Permit # 17485-A94Q Expires 1/1/94 Cumulative Total - 1 yd Permitted Volume - 1,000 yds	00001	Y	01	T

Type:
- D - Drum
- C - Carton
- B - Bag
- T - Truck
- P - Pounds
- Y - Yards
- O - Other

I hereby certify that the above named material does not contain free liquid as defined by 40 CFR Part 260.10 or any applicable state law, is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations.

Generator Authorized Agent Name: DONALD DEARDORFF
Signature: [signature]
Shipment Date: 102293

TRANSPORTER

Truck No.: 463
Phone No.: 567-3330

Transporter Name: Browning Ferris Industries
Driver Name (Print): Richard Wilson

Address: 11500 Bowling Green
Maryland Heights, Mo. 63146
Vehicle License No./State: 33-3147 MO

Vehicle Certification:

I hereby certify that the above named material was picked up at the generator site listed above.

Driver Signature: [signature]
Shipment Date: 102293

I hereby certify that the above named material was delivered without incident to the destination listed below.

Driver Signature: [signature]
Delivery Date: 102293

DESTINATION

Site Name: BFI - Missouri Pass Landfill
Phone No.: 314 - 739 8472

Address: 2520 Adie Road, ~~Md Hts~~ Maryland Heights, Mo. 63043

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

of Authorized Agent
Signature
Receipt Date

PASS CODE

10/86

BFI260-720

GENERATOR RETAIN

Mel Carnahan
Governor

Richard A. Hanson
Commissioner

State of Missouri
OFFICE OF ADMINISTRATION
Post Office Box 809
Jefferson City
65102

Randall G. Allen, AIA
Director
Division of Design and Construction
314-751-3339

NOV 22 1993
RECEIVED

November 17, 1993

Ed D. Alizadeh
Geotechnology, Inc.
2258 Grissom Drive
St. Louis, MO 63146

RE: Restoration of Playground
Hubert Wheeler State School
St. Louis, Missouri
Project No. 05-523-93-0001 (A)

Dear Mr. Alizadeh:

We have completed our review of your testing and analysis (draft copy) report dated October 4, 1993 for Subsurface Assessment, Playground Site Restoration, Hubert Wheeler State School at 5707 Wilson Avenue in St. Louis, Missouri.

Please address the following review requirements:

1. The report must show project number given above along with the Account Numbers 307-74536-1232 and 307-72876-0992.

2. The report must tell us which compounds we should be concerned about and which, in your opinion, we should not be concerned about. Same for metals. We should be given a reference point to establish comparisons for found compounds and metals.

3. Additional investigation and exploratory excavations may be conducted simultaneously with local efforts to remove any additional barrels or sources of contamination, combining further investigation with a solution.

4. Please submit "Final Copy" of this report to Department of Natural Resources, Department of Environmental Quality, Hazardous Waste Program. Please send us any information that these agencies may pass along to you.

5. A copy of this report was forward to Mr. Ron Littich of the Department of Elementary and Secondary Education.

Sincerely,

Gerald L. Bonnot

Gerald L. Bonnot, P.E.
Division of Design and Construction

GB:sw

cc: Ron Littich, Department of Elementary and Secondary Education
Walter Johannpeter, P.E., Division of Design and Construction
File

LT1337GB.sw

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OCT 0 1 1993

WASTE MANAGEMENT
DOCHMC ENV
COMMUNITY HEALTH SERVICES

OFFICE US[E ONL]Y	
Special Waste I.D.	48
Special Waste Registration No.	1748S-A94Q

ST. LOUIS COUNTY

APPLICATION FOR DISPOSAL OF SPECIAL WASTE

OCT 18 1993

[Und]ersigned is applying for authorization to dispose of Special Waste in St. Louis County as provided by Chapter 607, Section 860, 1981.

[IMPOR]TANT: Application must be completed in full (Do not leave any sections blank) and accompanied by Missouri Department of Natural [Resourc]e's Special Waste Approval.

[Genera]tor (To Be Completed By Generator)

[Co]mpany / Individual Missouri Department of Elementary & Secondary Education

[Ma]iling Address P.O. Box 480

[Cit]y, State, Zip Jefferson City, Missouri 65102

[Co]ntact Person Ronald Littich Telephone (314) 751-8296

[Gener]ation Rate (To Be Completed By Generator)

[On]e Time Disposal 2-1,000 cu. yds.

[Pe]riodic / Continuous ——— cu. yds. per ——— (mo., yr.)

[Waste] Information (To Be Completed By Generator)

[W]aste Description Soils contaminated with coal tar

[L]ocation of generated waste Hubert Wheeler School, 5707 Wilson Ave., St. Louis, MO 63110

[Br]iefly describe the process by which this waste is generated. Enclose a process flow chart if available. Waste consists of drill cuttings generated during sampling of coal tar contaminated soils.

[P]hysical Characteristics (Color, Odor, Consistency, etc.) Reddish brown color, no odor, solid

[C]hemical Characteristics (Attach a completed copy of the Missouri Department of Natural Resources Special Waste Disposal Request if applicable and laboratory analyses performed). See attached analytical

For neutralized infectious and hazardous, describe the method(s) of neutralization: (i.e., autoclaving, incineration, etc.). N/A

Name of neutralization company if different from generator. N/A

For neutralized infectious and hazardous waste, please describe the quality control safeguard(s) used including indicator(s): (i.e., time/temp. charts, bacillus stearothermophilus spore assay, chamber retention times and temps.,etc). N/A

[Tran]sportation (To Be Completed By Generator)

Waste Hauling Company Browning Ferris Industries

Mailing Address 11432 Bowling Green Drive

City, State, Zip Maryland Heights, MO 63146

Contact Person Stacy Hillis Telephone (314) 567-3330

County Hauling Vehicle Permit Number(s) 4352 thru 4367

County Hauling Container Permit Number(s) 3301 thru 3500

[Disp]osal (To Be Completed By Disposal Facility)

[Th]e loads shall be individually recorded at the disposal facility. St. Louis County's approval is contingent upon the disposal facility's [agre]ement to accept this Special Waste.

Disposal Facility Browning Ferris Industries MO-Pass Landfill

Contact Person Mitch Stepro

Form SWO-2

1001931337C01 86CHECK $50.00

10

Metropolitan
St. Louis Sewer
District

Department of Environmental Compliance
10 East Grand Avenue
St. Louis, MO 63147-2913
(314) 436-8710
FAX (314) 436-8753

October 12, 1993

Mr. Sam Brenneke
GEOTECHNOLOGY, INC.
2258 Grissom Drive
St. Louis, MO 63146

Dear Mr. Brenneke:

We have reviewed your application dated September 29, 1993 requesting approval to discharge 110 gallons of wastewater to the Metropolitan St. Louis Sewer District for treatment. This wastewater is from cleaning and decontamination of well drilling and sampling equipment at Hubert Wheeler State School, 5707 Wilson Avenue, St. Louis, Missouri.

Based on the analytical results, this wastewater meets MSD Ordinance 8472 standards and is approved for discharge into a <u>sanitary</u> sewer on site. The discharge into the sewer must be controlled at a rate that will not surcharge the lines in that area. This approval is valid for 30 days from the date of this letter.

You must be certain the waste is discharged into a <u>sanitary</u> or combined sewer inlet only. This letter does not authorize any discharge to a separate storm sewer, or to any watercourse, as any such discharge would be in violation of state and federal laws.

This discharge has been approved based upon the information and sample analyses you provided, and is subject to the conditions stated above. This approval may be revoked by the District at any time if any of the information is found to be incorrect, or if the conditions of this approval are violated. Also, if the discharge causes any operational or maintenance problem within the District's collection or treatment system, or results in violations of any conditions of the District's NPDES permit, Missouri Department of Elementary and Secondary Education will be considered responsible for damages.

If you have any questions, please call me at 436-8757.

Sincerely,
METROPOLITAN ST. LOUIS SEWER DISTRICT

Michael Townley
Michael Townley
Civil Engineer

jf
pc Bernie Rains
Ronald Littich, Director of Facilities
Missouri Department of Elementary and Secondary Education

DRAFT

SUBSURFACE ASSESSMENT
PLAYGROUND SITE RESTORATION
HUBERT WHEELER STATE SCHOOL
5707 WILSON AVENUE
ST. LOUIS, MISSOURI

Prepared for:

STATE OF MISSOURI
DIVISION OF DESIGN AND CONSTRUCTION
Jefferson City, Missouri

Prepared by:

GEOTECHNOLOGY, INC.
St. Louis, Missouri

October 4, 1993

2498.01.3120.01

REPORTE\249801.SUB

October 4, 1993 2498.01.3120.01

Mr. Gerald Bonnot
Division of Design and Construction
State of Missouri - Office of Administration
P.O. Box 809
Jefferson City, Missouri 65102

SUBSURFACE ASSESSMENT
PLAYGROUND SITE RESTORATION
HUBERT WHEELER STATE SCHOOL
5707 WILSON AVENUE
ST. LOUIS, MISSOURI

Dear Mr. Bonnot:

Presented in this report are the results of the Subsurface Assessment conducted for the above-referenced site. The assessment was conducted in general accordance with Geotechnology, Inc. Proposal P3995.00.3127 dated March 25, 1993.

We appreciate the opportunity to be of service to you. If you have any questions, please do not hesitate to contact me.

Yours very truly,

GEOTECHNOLOGY, INC.

Ed D. Alizadeh, P.E.
Principal

SLB/EDA:slb/tlp/mls

Copies submitted: (2)

cc: Mr. Ronald Littich, Director of Facilities
Missouri Department of Secondary and Elementary Education

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SUBSURFACE ASSESSMENT
PLAYGROUND SITE RESTORATION
HUBERT WHEELER STATE SCHOOL
5707 WILSON AVENUE
ST. LOUIS, MISSOURI

DRAFT

1.0 INTRODUCTION

1.1 Site Description. The Hubert Wheeler State School is located at 5707 Wilson Avenue in St. Louis, Missouri, as shown on Plate 1. The site is located north of Wilson Road just south of Interstate 44, in a mixed commercial and residential area. The Deaconess Hospital, Executives Examination Facility is located adjacent to the site on the west. Residential areas are located east and south of the site.

During recent years, a black tar-like material, resembling coal tar, has occasionally oozed from the ground surface in the courtyard area, at the northwest corner of the subject site. The oozing reportedly occurred more frequently during warm periods of the year. The school placed asphalt paving over the courtyard area to minimize the problems associated with the tar-like material. However, the material continues to ooze through the asphalt in various locations. In addition, several years ago, school maintenance personnel installed a concrete walkway from the asphalt playground to the school. During excavation for the walkway, the black material was reportedly "flowing" at a depth of approximately 3 feet. At least one drum was also discovered during the excavation.

1.2 Historical Documents Review. A 50 year chain of title search was completed and historical building and occupancy permits were reviewed in an attempt to identify previous owners and past uses of the site. In addition, available aerial photographs from photogrammetric reconnaissances conducted in 1960, 1964, and 1969 were reviewed to determine past land usage. Copies of the building and occupancy permits, aerial photographs, and the 50 year chain of title search are presented in Appendix A.

The information obtained from the historical documents review indicates that between 1907 and 1959 the site and surrounding area was controlled by a succession of property owners including Laclede Fire Brick Manufacturing Company, Laclede-Christy Company, and the H. K. Porter Company. The property was sold to Ann S. Dattilo in 1959 who leased the property to H. K. Porter Company and Jablonlow-Kom Theatres until the property was sold in 1966 to a consortium of investors for the Hampton Industrial Park. Building and occupancy permits indicate that between 1950 and 1967 office and warehouse facilities were constructed by St. Louis Coke and Foundry Supply and by M. W. Warren Coke Company. In addition, a warehouse facility constructed in 1960 for the St. Louis Coke and Foundry Supply was apparently used for the storage of V.M.P. Naptha.

A review of aerial photographs taken in 1960 and 1964 indicate the site was vacant with apparent landfilling operations occurring north and west of the site. Buildings and structures likely associated with the foundry and coke companies were located north of the site. By 1969, the site appeared abandoned, buildings previously located north of the site had been demolished and the landfilling operations appeared to have ceased.

2.0 SITE ASSESSMENT

2.1 Drilling Summary. Drilling activities were conducted on August 23 and 24, 1993. The borings were drilled using a CME 550 drill rig with 3-3/4 inch I.D. hollow stem augers. Continuous soil samples were collected with a split-spoon continuous sampler. The drilling and sampling activities were observed by a scientist from Geotechnology. The scientist obtained samples for analytical testing and prepared descriptive logs of the borings.

A high-pressure steam cleaner was utilized to decontaminate the hollow stem augers between borings. The augers were decontaminated utilizing a detergent wash solution followed by a thorough rinse with clean water. The sampling equipment was decontaminated between each use via a hand-brush wash of the disassembled components with a solution of laboratory detergent followed by a clean water rinse. Rinsate from the decontamination of drilling and sampling equipment was containerized and temporarily stored on-site pending waste characterization and disposal permitting.

A total of ten borings were completed at the site. One additional boring adjacent to and south of the concrete pad, located east of the courtyard area, was terminated at a depth of approximately 4 feet; limestone rock, likely related to a previous excavation performed in the vicinity of the concrete pad, was encountered. The completed borings were terminated at a depth of 10 feet. Bedrock was not encountered in the borings at the depths explored. The borings were backfilled with soil cuttings following completion of each boring. Excess cuttings were containerized in 55-gallon drums and were stored temporarily on-site pending waste characterization and disposal permitting.

The boring locations, shown on Plate 1, are approximate and were measured from existing on-site features. The locations of Borings B-8, B-9, B-10A, and B-10 were revised from those depicted in the sampling plan, in an effort to locate the source of the apparent coal tar seeps in the area. Descriptive boring logs and a legend are included as Appendix B.

2.2 Field Screening and Sampling Program. The soil samples were observed for visual staining and field-screened for the presence of volatile organics using a Photovac Microtip photoionization detector (PID). The PID was calibrated to an isobutylene standard of 100 parts per million (ppm) at the beginning of each day.

PID readings, above background levels, were detected in Borings B-1, B-3, and B-5. The soil sample yielding the highest PID reading for each of those borings was retained for subsequent laboratory analyses. The soil samples obtained from the remaining borings yielded PID readings which were non-detect. For those borings, the sample exhibiting visual oil staining or discoloration was retained for subsequent laboratory analyses. Soil samples were not obtained from Boring B-10A. The PID readings are summarized on the boring logs included in Appendix B.

One soil sample from each completed boring was submitted to Environmetrics, Inc. of Maryland Heights, Missouri for laboratory analyses. The soil samples were analyzed for priority pollutants including metals, volatiles, semi-volotiles, pesticides and PCB's, total cyanide, and total phenol by EPA Methods 6000/7000, 8240, 8270, 8080, 9012, and 9066, respectively. In addition to the priority pollutant analyses, the soil sample collected from Boring B-8 was analyzed for TCLP Lead using EPA Method 1311/7421, and the soil samples obtained from borings placed in the apparent coal tar seeps (B-8 and B-9) were screened for the presence of Dioxin using SOW Method 880.

3.0 RESULTS

3.1 Site Stratigraphy. The soil stratigraphy, as indicated by the soil borings, generally consisted of 6 to 8 feet of rubble fill consisting of brown and green silty clays with brick, gravel, sand, and cinders. Below the rubble fill was a medium stiff to stiff, brown or brown and gray, mottled silty clay which extended to the depth explored. Groundwater was not encountered at the depths explored. However, moist soils were encountered in Borings B-1, B-9, and B-10 and appeared to correspond with concentrated lenses of gravel, rock, and cinder fill.

3.2 Soil Sample Analytical Results. The analytical results detected several priority pollutant metals, volatile organics, and semi-volatile organics in the samples. The remainder of the parameters tested were either not detected or were detected at concentrations equal to or slightly above the analytical detection limit for the parameter tested.

The priority pollutant metals detected in the samples included, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc. While most of these metals were detected at concentrations which are likely considered background for the soils in this area, the concentrations of lead detected in the samples ranged from 14.5 to 338 parts per million (ppm). Total lead levels greater than 100 ppm were detected in samples obtained from 6 of the 10 borings and levels exceeding 300 ppm were detected in Borings B-3, B-6, and B-8. Following completion of the total metals analyses, the sample from Boring B-8 was submitted for TCLP Lead analyses to determine if the soils were characteristically hazardous due to lead. The analytical results for the TCLP analysis indicate a TCLP lead concentration of 0.123 ppm which is not hazardous in accordance with 40 CFR 261.24(b).

The priority pollutant volatile organics detected in the samples were detected at low levels (less than 0.15 ppm) and included, toluene, ethylbenzene, xylene, chloromethane, acetone, methylene chloride, and bromomethane. In addition, while methylene chloride was detected in each of the samples, it was also detected in the laboratory method blank indicating possible laboratory contamination.

Numerous semi-volatile organics, typical of coal-tar contamination, were detected in Borings B-1, -2, -3, -4, -5, -6, -8, and -10. Semi-volatile organics were not detected in Boring B-7 which was placed west of the asphalt play ground area. In addition, semi-volatile organics were not detected at Boring B-9 which was placed into an apparent coal tar seep. However, due to matrix interference in the sample, the lab was not able to obtain an analytical detection limit below 6.1 ppm for that sample. Therefore it is possible that semi-volatile organics were present in the Boring B-9 sample at concentrations below 6.1 ppm. The highest concentrations of semi-volatile organics contamination were detected in the vicinity of Borings B-6 and B-10. Tables 1 and 2 summarize the analytical results for the metals and semi-volatile organics detected in the samples. The analytical results sheets for the samples collected from the borings are presented in Appendix C.

4.0 CONCLUSIONS

4.1 General Assessment. Based on visual observations of the soil samples collected from the borings, significant subsurface deposits of tar-like material were not encountered by the borings. There was however, visual evidence of discolored soils and soil staining observed in the samples obtained from the borings. The discolored or stained soils were for the most part limited to the rubble fill and did not extend into the naturally occurring soils which were encountered at depths of 8 to 10 feet below ground surface.

The analytical results indicate semi-volatile organic contamination typical of residual coal tar contamination. In addition, elevated levels of lead were detected in near surface soils collected from Borings B-8, B-6, and B-3. The elevated concentrations of lead do not appear to be related to the apparent coal tar contamination as the samples with the highest lead levels were not the samples with the highest semi-volatile organics.

The highest levels of semi-volatile organics contamination were detected in the vicinity of Borings B-6 and B-10. The location of these borings, when compared with other borings (B-1, B-8, and B-3) with lesser contamination located in close proximity to the area where apparent coal tar wastes were previously removed, indicates there may be additional sources of coal tar like wastes. In addition, it may also be possible, that soil contamination detected at the site, is due to the placement of contaminated fill material and not related to additional leaking sources of coal tar like wastes. In either case, the extent of coal tar and/or lead contamination has not been defined and may extend to other locations of the site.

As indicated previously in the report, the upper 6 to 8 feet of the courtyard area consists of rubble fill including brown and green silty clays, brick, gravel, sand, and cinders. Historical areal photographs appear to document filling operations at the site and areas north and west of the site during the early 1960's. The title summary and building and occupancy records indicate the site and surrounding areas were owned and/or operated by St. Louis Coke and Foundry Supply and by M. W. Warren Coke Company during that period. These facilities were likely involved with the apparent filling operations in the sixties and are likely sources for the types of contaminants identified at the site.

4.2 Regulatory Considerations. Based on present data, it is apparent that soil contamination has resulted from the previous operations at the site. It is our understanding that environmental regulatory agencies, such as the Missouri Department of Natural Resources (MDNR) or the Environmental Protection Agency (EPA), have not been involved at this site. These agencies, when informed of a release or potential release of a hazardous substance, will determine if additional investigation or remediation is warranted. This determination is made based on the types of hazardous substances identified, the quantities or concentrations of those substances present at the site, and the risk those substances pose to public health and the environment. Regulatory cleanup standards and/or action levels which trigger additional investigation or remediation are typically site specific and vary from site to site based on current use of the site and the potential for exposure to the public and damage to the environment. In the absence of established, site-specific regulatory action levels, estimated action levels can be established based on previously promulgated standards and on data developed by the USEPA for the Resource Conservation And Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation And Liability Act (CERCLA or Superfund) programs.

The data developed by the USEPA can be utilized to develop quantitative risk assessment values for many chemical substances which do not have promulgated clean-up standards. By employing the verified Reference Dose (RfD) available from the USEPA IRIS on-line database, risk assessment values can be calculated for soil ingestion rates. The calculations presented in Appendix D are based on USEPA-established procedures and provide risk-based action levels for soil cleanup of Fluoranthene, Pyrene, Benzo(a)pyrene, Benzo(b)fluoranthene, and Chrysene.

When available, action levels may be based on risk based health standards previously established by various Health or Environmental Regulatory agencies. Lead is one such substance which has been widely studied by various Health and Environmental Agencies. The EPA and the Missouri Department of Health (DOH) both have established health based standards for lead in near surface soils at residential areas. While the two standards are different, with the DOH setting more conservative levels, these standards provide reasonable indications of cleanup levels for lead contaminants at the site.

The estimated soil cleanup action levels for the site are presented in Table 3. As indicated previously, we have estimated the levels on previously promulgated standards or guidelines established by the DOH, MDNR, and the USEPA and on risk-based action level calculations established by the USEPA. The actual cleanup levels for this site will be determined by the regulatory agencies.

5.0 RECOMMENDATIONS

Based on the information obtained from the investigation and discussed above we offer the following recommendations for your consideration.

- Additional investigations should be performed in an attempt to locate additional buried drums at the site and to define the full extent of soil contamination. We recommend a magnetometer/gradiometer survey be conducted in an attempt to identify magnetic anomalies indicative of buried metal. Exploratory excavations could then be performed to identify the source or sources of any magnetic anomalies identified at the site.

- Following completion of the magnetometer/gradiometer survey, a remedial investigation plan should be developed and submitted to the MDNR along with the information generated during previous investigations, for their concurrence with planned investigations and to obtain site specific clean-up levels for the site.

TABLE 1

ANALYTICAL RESULTS SUMMARY
METALS AND SEMI-VOLATILE ORGANICS ?

METALS DETECTED	BORINGS									
	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10
Arsenic	4.33	7.97	7.65	7.95	6.07	8.81	8.97	9.55	6.93	7.42
Beryllium	0.525	0.620	0.852	0.646	0.335	0.387	0.693	0.408	0.565	0.514
Cadmium	0.830	0.907	1.34	0.581	0.656	1.22	0.713	0.806	0.865	1.77
Chromium	14.9	18.9	13.7	21.0	12.2	62.2	18.6	12.0	13.2	9.62
Copper	17.6	29.4	35.5	13.3	9.68	54.5	15.3	13.9	20.2	13.3
Lead (total)	192	139	303	40.7	79.9	308	14.5	338	115	33.6
Lead (TCLP)	NA	NA	NA	NA	NA	NA	NA	0.123	NA	NA
Mercury	0.14	0.47	0.25	ND	0.26	0.63	ND	ND	0.11	0.39
Nickel	15.8	18.9	17.9	16.8	10.9	13.8	19.8	11.6	18.3	13.7
Selenium	ND	0.391	0.635	ND	ND	0.332	ND	0.520	0.530	ND
Silver	0.500	0.729	ND	0.586	ND	ND	ND	ND	0.720	0.986
Zinc	114	113	293	64.6	80.8	232	50.6	163	98.0	44.5

1 - Analtical Results are presented as Parts Per Million (mg/kg, mg/l)
NA - Parameter not analyzed
ND - Parameter not detected above the analytical detection limit

Proposed ASL's

TABLE 2
ANALYTICAL RESULTS SUMMARY
SEMI-VOLATILE ORGANICS

SCDM	DOH	SEMI-VOLATILE ORGANICS DETECTED	BORINGS									
			B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10
		2-methynaphthalene	.055	ND	ND	ND	0.160	ND	ND	.15	ND	2.4
—		Acenaphthylene	.072	ND	0.080	ND	0.71	ND	ND	.110	ND	1.4
		Acenaphthlene	1.04	ND	0.150	ND	0.69	ND	ND	2.1	ND	8.2
—		Dibenzofuran	.610	ND	0.085	ND	0.44	ND	ND	1.2	ND	4.5
	2300	Flourene	1.3	ND	0.130	ND	0.57	ND	ND	2.3	ND	6.7
—		Phenanthrene	12.0	0.32	1.8	.120	6.1	33.0	ND	23.0	ND	83.0
170000	17,000	Anthracene	2.9	ND	0.35	ND	1.2	7.2	ND	6.5	ND	16.0
		Carbazole	1.4	ND	0.16	ND	0.82	ND	ND	3.0	ND	12.0
		Bis-Butylphthalate	0.17	0.15	0.58	.081	ND	ND	ND	.068	ND	ND
	2300	Flouranthene	13.0	0.31	2.4	.120	8.4	36.0	ND	28.0	ND	104.0
	1700	Pyrene	8.6	0.28	2.5	.106	6.4	35.0	ND	20.0	ND	93.0
—	.44	Benzo(a)anthracene	5.0	0.13	1.2	ND	3.4	14.0	ND	12.0	ND	45.0
—	.44	Chrysene	4.2	0.16	1.3	.056	3.3	15.0	ND	12.0	ND	54.0
	.44	Benzo(b)Flouranthene	5.3	0.20	1.9	.089	5.2	16.0	ND	14.0	ND	62.0
—	.44	Benzo(k)Fluoranthene	1.7	0.074	0.52	ND	0.45	7.0	ND	4.6	ND	29.0
.008	.44	Benzo(a)Pyrene	3.8	0.048	1.07	ND	3.0	13.0	ND	9.8	ND	41.0
—	.44	Indeno(1,2,3-cd)pyrene	1.8	0.082	0.57	ND	1.4	5.5	ND	4.7	ND	18.0
—	.44	dibenzo(a,h)anthracene	0.46	ND	0.17	ND	0.42	ND	ND	1.4	ND	6.0
		benzo(g,h,i)perylene	1.6	0.077	0.56	ND	1.4	5.1	ND	4.3	ND	18.0
23000		Naphthalene	ND	ND	ND	0.26	ND	ND	ND	.16	ND	3.9

1 - Analtical Results are presented as Parts Per Million (mg/kg, mg/l)
NA - Parameter not analyzed
ND - Parameter not detected above the analytical detection limit

22.

TABLE 3

ESTIMATED SOIL ACTION LEVELS

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL DETECTED (ppm)	ESTIMATED SOIL ACTION LEVEL (ppm)
Fluoranthene	104.0	3,200
Pyrene	93.0	1,600
Benzo(b)fluoranthene	62.0	0.96
Chrysene	54.0	9.6
Benzo(a)pyrene	41.0	0.096
Lead	338.0	240[1] 500[2]

[1] Missouri Department of Health standard for lead in surface soils at residential areas.

[2] Environmental Protection Agency health based standard for lead in surface soils at residential areas.

2498.01.3120 01

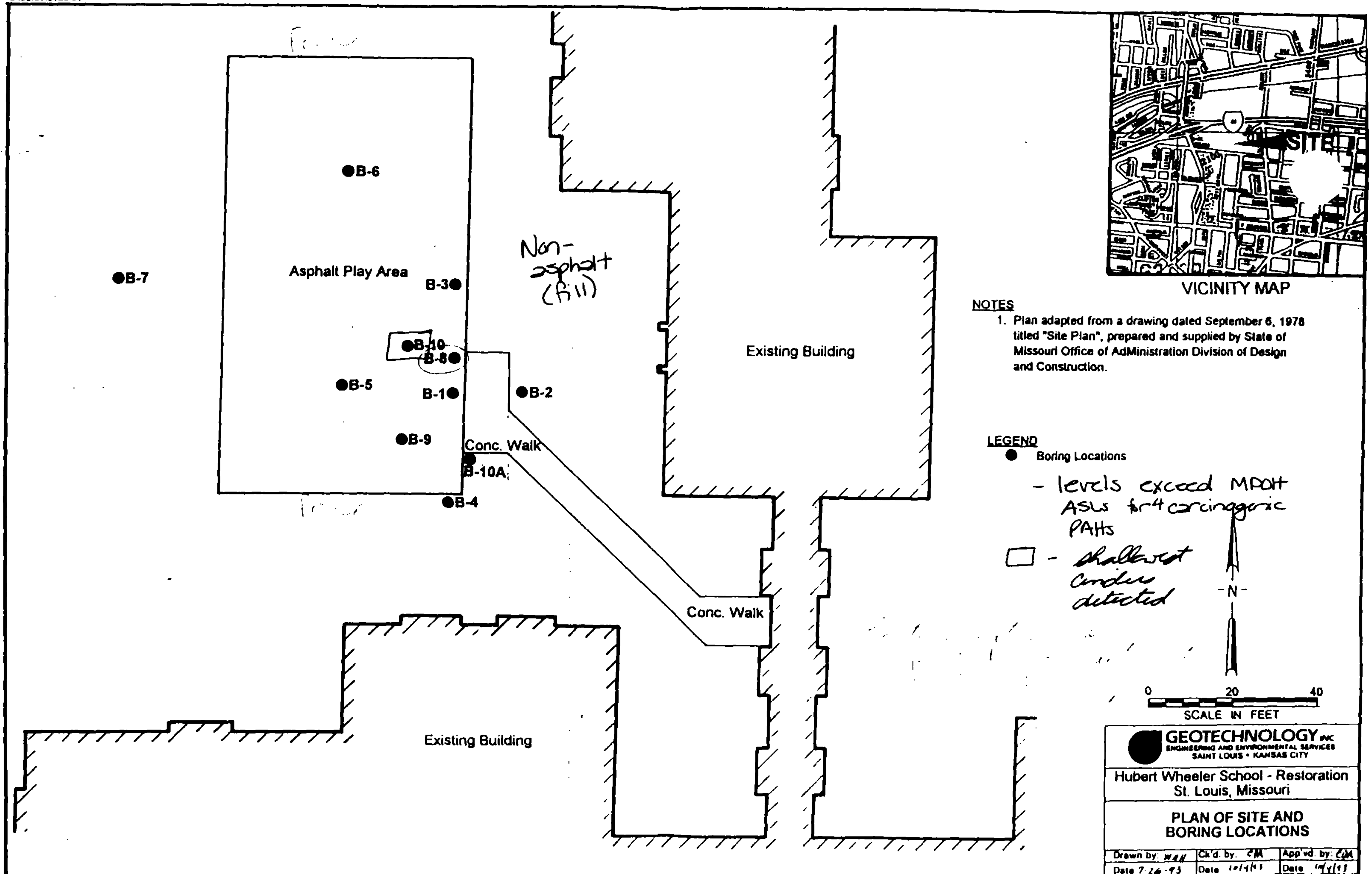

PLATE 1

APPENDIX A

HISTORICAL DOCUMENTS

1960 Aerial

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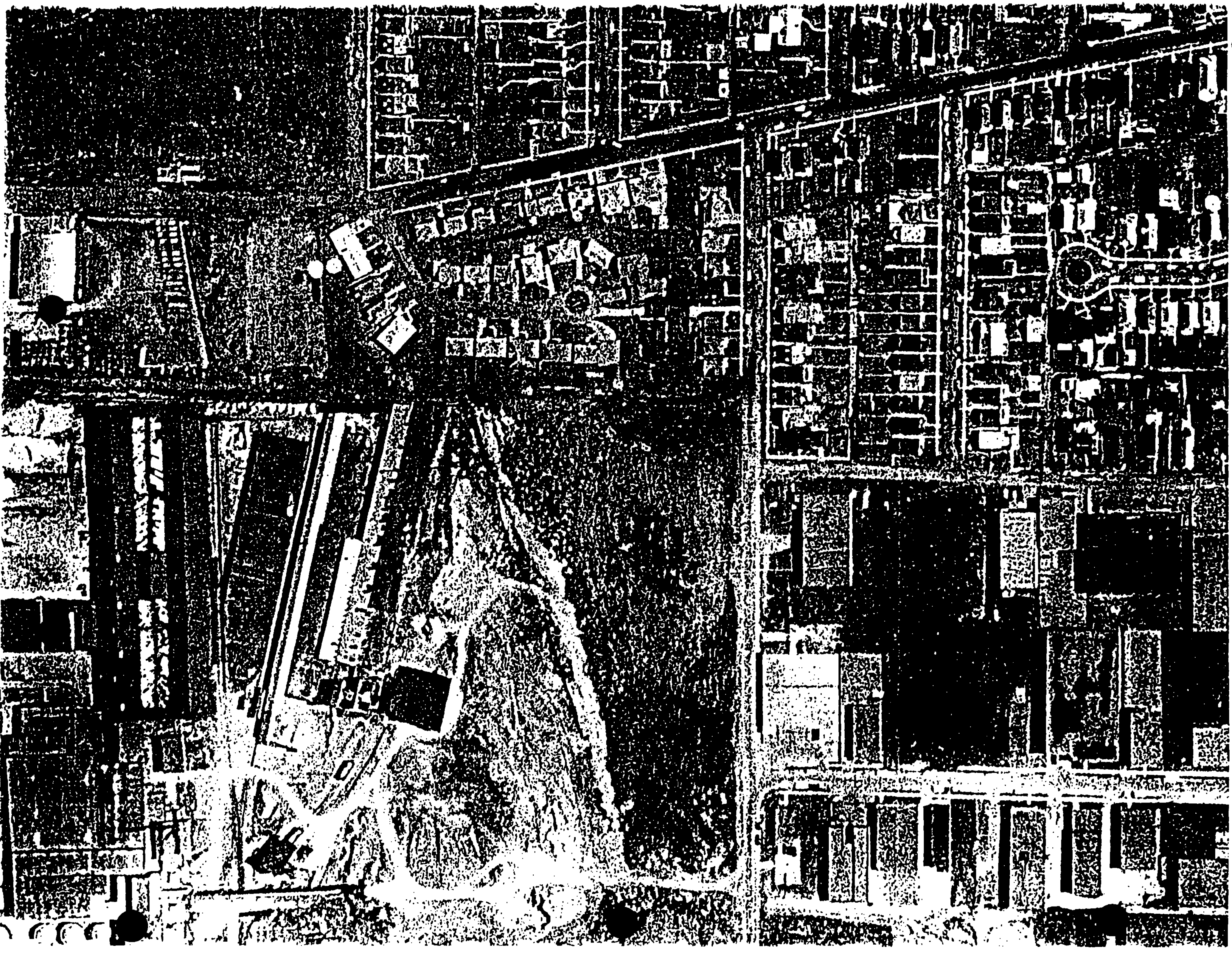

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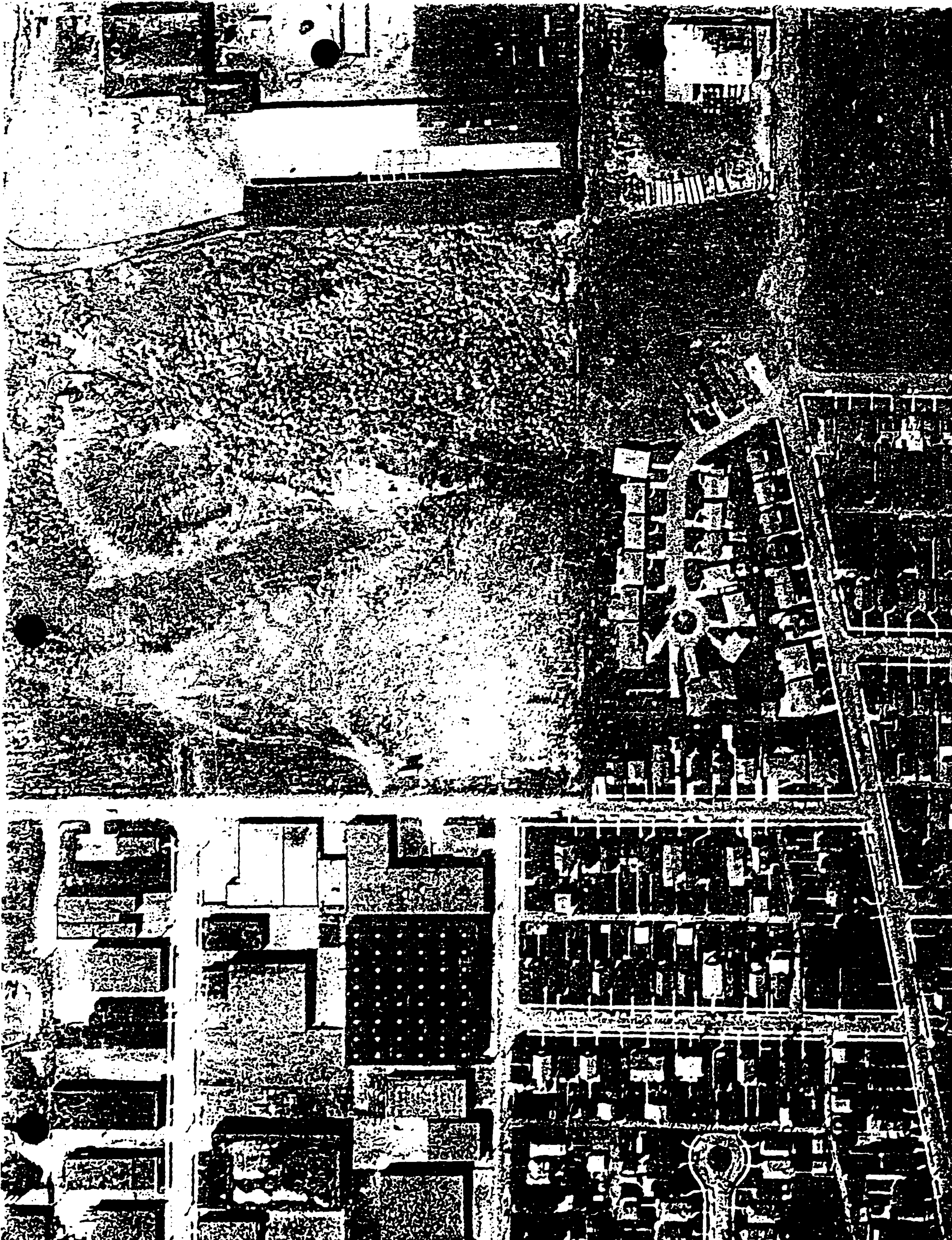
1964 Aerial



1969 Aerial

Geotechnology, Inc.
2258 Grissom Drive
St. Louis, Missouri 63146

Attention: Sam Brenneke

50 Year Chain of Title Report of conveyance deeds that transfer ownership and any leases of record for the following described property:

Lots 29, 30, 31, 32, 33 and part of Lots 27 and 28 in Block 2 of Cheltenham, Lots 21, 22, 23 and part of Lot 20 of Wible's Eastern Addition to Cheltenham, together with the Western 36 feet of former January Avenue vacated under the provisions of Ordinance No. 52058, and in Blocks 4022 and 4023 of the City of St. Louis, more particularly described as follows: Beginning at a point in the North line of Wilson Avenue, 40 feet wide, at its intersection with a line 36 feet East of and parallel to the West line of former January Avenue, 60 feet wide, as vacated under the provisions of Ordinance No. 52058; thence North 82 degrees 57 minutes 15 seconds West along said North line of Wilson Avenue a distance of 355.20 feet to a point; thence North 8 degrees 15 minutes 30 seconds East a distance of 472.56 feet to a point in the Southerly Right-of-Way line of Interstate Highway I-44; thence in an Easterly direction along said Right-of-Way line North 87 degrees 03 minutes 45 seconds East a distance of 25.59 feet to an angle point being located in the Eastern line of Lot 20 of Wible's Eastern Addition to Cheltenham, said point being 477 feet North along the Eastern line of said Wible's Addition from the Northern line of Wilson Avenue, 40 feet wide; thence South 87 degrees 53 minutes 03 seconds East and along said I-44 Right-of-Way line 295.71 feet to a point in the West line of said former January Avenue vacated as aforesaid at a point being 502.42 feet North along said line from the Northern line of Wilson Avenue; thence North 74 degrees 42 minutes 01 seconds East along the South Right-of-Way line of I-44 a distance of 39.27 feet to a point in a line 36 feet East of and parallel to said West line of former January Avenue, vacated as aforesaid; thence South 8 degrees 15 minutes 30 seconds West along said line 36 feet East of the West line of former January Avenue, vacated as aforesaid, a distance of 517.36 feet to the point of beginning.

Warranty Deed recorded June 29, 1907 in Book 2046 page 90 from Laclede Fire Brick Manufacturing Company to Alexander R. Russell;

Warranty Deed recorded June 29, 1907 in Book 2030 page 478 from Alexander R. Russell to Laclede-Cristy Company;

Quit Claim Deed recorded January 2, 1959 in Book 7912 page 586 from Laclede-Cristy Company to H. K. Porter Company, Inc.;

Warranty Deed recorded May 29, 1959 in Book 7960 page 559 from H.K. Porter Company, Inc. to Ann S. Dattilo;

Lease recorded May 29, 1959 in Book 7966 page 29 by and between Ann S. Dattilo as Landlord and H.K. pORTER cOMPANY, iNC. as Tenant. (term 5 years);

Lease recorded August 13, 1965 in Book 8617 page 122 by and between Ann S. Dattilo, Lessor and Jablonow-Komm Theatres, Inc. as Lessee (term 15 years with 10 year option);

Quit Claim Deed recorded June 9, 1966 recorded in Book 8686 page 316 from Ann S. Dattilo to Raymond J. McManemin, Lawrence J. Camie, Carl C. Sciuto, Calogero Rallo, Salvatore Rallo, Nick Rallo, Peter J. Rallo, Joseph S. Rallo and Charles Rallo, Jr. D/B/A Hampton Industrial Park the percentage being 21%, 21%, 16%, 7%, 7%, 7%, 7%, 7%, 7% respectively.
NOTE: Western 36 feet of abandoned January are not included in this conveyance.

Warranty Deed recorded April 16, 1968 recorded in Book 8828 page 360 from above parties and their spective spouses to State Department of Education, Herbert Wheeler, Commissioner.

NOTE: No spouse or marital status listed for Calogero Rallo.
NOTE: This conveyance includes the Western 36 feet of abandoned January Avenue, not conveyed to grantors above.

Lawyers Title Company of Missouri assumes no liability over the amount paid for this report.

EFfective date: July 19, 1993
K-25965

LAWYERS TITLE COMPANY OF MISSOURI

By: [signature]

PERMIT No.	LOCATION	DATE	BLOCK No.
c9217	2064 Hampton	2-15-67	4022

USE wreck 1 sty. fr. bldg. & 1-2sty. brick & steel bldg. COST 27000

OWNER Mo. State Highway

Application Rec'd.	ROUTE #1	ROUTE #2	ROUTE #3
FEB 9 1967	FEB 9 1967		

REMARKS:

PERMIT No.	LOCATION	DATE	BLOCK No.
C5558	1529 Sublette	6-17-66	4022

USE Erect 1-1 story aluminum addition COST $15000

OWNER St Louis Coke & Foundry Supply

Application Rec'd.	ROUTE #1	ROUTE #2	ROUTE #3
MAR 30 1966	APR 8 [illegible]	[illegible]	

REMARKS:

PERMIT No.	LOCATION	DATE	BLOCK No.
EE 6124	1525 Sublette	12-9-60	4022

CO 9294

USE OP 8460 COST Oc.Permit

Office-warehouse-V.M.P.Naptha

OWNER St.Louis Coke & Foundry Supply

ARCHITECT

FORM NO. 277-M

PERMIT No.	LOCATION	DATE	BLOCK No.
S 4152	1529 Sublette	4-12-50	4022

USE Erect 1 sty. metal office & whse. COST 58,000.00

OWNER M. W. Warren Coke Co.

ARCHITECT

FORM NO. 277-M

PERMIT No.	LOCATION	DATE	BLOCK No.
U 5384	1529 Sublette	11-18-50	4022

USE Erect 1 sty.fr.priv.garage COST $ 1500

OWNER M.W.Warren Coke Co.

ARCHITECT

FORM NO. 277-M

PERMIT No.	LOCATION	DATE	BLOCK No.
H6635	1931 Forest	4-19-26	4022

USE 1 story frame shed COST $350.00

OWNER C D Barkley

ARCHITECT

3

APPENDIX B

BORING LOGS AND LEGEND

Surface Elevation __ Datum __	C[illegible]tion Date: 8-23-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES	SHEAR STRENGTH, tsf (Δ - UU/2, O - QU/2, □ - SV; .5, 1, 1.5, 2, 2.5) / STANDARD PENETRATION RESISTANCE (ASTM D 1586) ▲ - BLOWS PER FOOT / PL — WATER CONTENT, % — LL (10, 20, 30, 40, 50)
	Asphalt over base course				
	RUBBLE FILL: SAND, GRAVEL and BRICK		0.0	SS	
	FILL: Brown and green, silty CLAY with wood, gravel and brick - CL		0.6		
			0.8	SS	
5			1.6		
			1.4	SS	
			0.0		
			0.0	SS	
10			0.0	SS	
	Boring terminated at 10.0 feet				
15					
20					
25					
30					
35					

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET
AT __ AFTER __ HOURS
AT __ AFTER __ HOURS
X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM
WASHBORING FROM __ FEET
PG DRILLER SLB LOGGER
CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: SLB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-1

Project No. 2488.01.3120.02	PLATE

Surface Elevation __

Datum __

Completion Date: 8-23-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
0	FILL: Brown, silty CLAY with brick and cinders - CL		0.0 / 0.0	SS
			0.0 / 0.0	SS
5	FILL: Green, silty CLAY - CL		0.0 / 0.0	SS
	FILL: Brown, gray and black, silty CLAY with brick and cinders - CL		0.0 / 0.0	SS
10	FILL: Black and green, silty CLAY with brick and cinders - CL		0.0 / 0.0	SS
	Boring terminated at 10.0 feet			

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ - BLOWS PER FOOT

PL WATER CONTENT, % LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET

AT __ AFTER __ HOURS

AT __ AFTER __ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM __ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: SCB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-2

Project No. 2498.01.3120.02

PLATE

Surface Elevation ___

Datum ___

letion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
	Asphalt over base course			
	FILL: Brown, silty CLAY with gravel, brick and cinders - CL		40, 79	SS
			80, 58	SS
5			45, 1.0	SS
	FILL: Gray, silty CLAY with wood and gravel - CL		0.0, 0.0	SS
	FILL: Brown, silty CLAY - CL Black cinder layer between 8.0 and 8.5 feet			
10	Stiff, brown and gray, mottled, silty CLAY - CL		0.0, 0.0	SS
	Boring terminated at 11.0 feet			
15				
20				
25				
30				
35				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ - BLOWS PER FOOT
PL WATER CONTENT, % LL
10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESEN. APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT ___ FEET

AT ___ AFTER ___ HOURS

AT ___ AFTER ___ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM ___ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SJI	Ck'd. by: SLB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-3

Project No. 2498.01.3120.02

PLATE

Surface Elevation ___

Datum ___

Completion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
0–5	FILL: Brown, silty CLAY with rubble, brick and cinders - CL		0.0, 0.0, 0.0, 0.0, 0.0	SS, SS
5	FILL: Gray CLAY - CH		0.0	SS
5–10	FILL: Brown, silty CLAY, trace gravel and cinders - CL		0.0, 0.0, 0.0, 0.0	SS, SS
10	Boring terminated at 10.0 feet			

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ - BLOWS PER FOOT

WATER CONTENT, %

PL LL

10 20 30 40 50

Depth scale: 5, 10, 15, 20, 25, 30, 35

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT ___ FEET

AT ___ AFTER ___ HOURS

AT ___ AFTER ___ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM ___ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: ScB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-4

Project No. 2498.01.3120.02

PLATE

Surface Elevation __

Datum __

C 'etion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
	Asphalt over base course			
	FILL: Limestone GRAVEL - GP		140	SS
			100	SS
5	FILL: Brown, silty CLAY with brick - CL		0.0	
			0.0	SS
	Brown, silty CLAY - CL		0.0	
			0.0	SS
			0.0	
10			0.0	SS
	Boring terminated at 11.0 feet			
15				
20				
25				
30				
35				

SHEAR STRENGTH, tsf
Δ - UU/2 O - QU/2 □ - SV
.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ - BLOWS PER FOOT
WATER CONTENT, %
PL LL
10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET

AT __ AFTER __ HOURS

AT __ AFTER __ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM __ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH | Ck'd. by: SLB | App'vd. by:
Date: 9-7-93 | Date: 10/4/93 | Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-5

Project No. 2498.01.3120.02

PLATE

38

Surface Elevation __

Datum __

Completion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
	Asphalt over base course			
	FILL: Brown, silty CLAY with brick, gravel, cinders and rubble - CL		0.0	
			0.0	SS
			0.0	
			0.0	SS
5			0.0	
			0.0	SS
			0.0	
	Stiff, brown and gray, mottled, silty CLAY - CL		0.0	SS
			0.0	
10			0.0	SS
	Boring terminated at 11.0 feet			
15				
20				
25				
30				
35				

SHEAR STRENGTH, tsf
Δ - UU/2 o - QU/2 □ - SV
.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE
(ASTM D 1586)
▲ - BLOWS PER FOOT
WATER CONTENT, %
PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET
AT __ AFTER __ HOURS
AT __ AFTER __ HOURS
X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM
WASHBORING FROM __ FEET
PG DRILLER SLB LOGGER
CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: S&B	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-6

Project No. 2498.01.3120.02

PLATE

Surface Elevation —

Datum —

C 'etion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
	FILL: Brown, silty CLAY with brick, gravel and cinders - CL		0.0 0.0	SS
			0.0 0.0	SS
	RUBBLE FILL: GRAVEL and BRICK		0.0	
5	Stiff, brown and gray, mottled, silty CLAY - CL		0.0	SS
			0.0 0.0	SS
			0.0 0.0	SS
10	Boring terminated at 10.0 feet			
15				
20				
25				
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ - BLOWS PER FOOT

PL WATER CONTENT, % LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESE... APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET

AT __ AFTER __ HOURS

AT __ AFTER __ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM __ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: SCB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-7

Project No. 2498.01.3120.02

PLATE

Surface Elevation __

Datum __

C[illegible]etion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
	Asphalt over base course			
	FILL: Brown, silty CLAY with brick, sand and cinders – CL		0.0 0.0 0.0 0.0	SS SS
5			0.0 0.0	SS
	FILL: Brown and gray, mottled, silty CLAY, trace sand and gravel – CL		0.0 0.0	SS
10	FILL: Brown, silty CLAY, trace cinders – CL		0.0 0.0	SS
	Boring terminated at 11.0 feet			
15				
20				
25				
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE

(ASTM D 1586)

▲ – BLOWS PER FOOT

PL — WATER CONTENT, % — LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET

AT __ AFTER __ HOURS

AT __ AFTER __ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

REMARKS:

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM __ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

Drawn by: SA	Ck'd. by: SLB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC

ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-8

Project No. 2498.01.3120.02

PLATE

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Surface Elevation __

Datum __

Completion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
0–0.5	Asphalt over base course			
0.5–7	FILL: Brown and green to black, silty CLAY with brick and cinders - CL		0.0 0.0 0.0 0.0 0.0 0.0	SS SS SS
7–10	Stiff, green to black, silty CLAY - CL		0.0 0.0 0.0	SS
10–11	Stiff, brown, silty CLAY - CL		0.0	SS
11	Boring terminated at 11.0 feet			

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ - BLOWS PER FOOT

PL WATER CONTENT, % LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET

AT __ AFTER __ HOURS

AT __ AFTER __ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM __ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: SLB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-9

Project No. 2498.01.3120.02

PLATE

Surface Elevation __

Datum __

C[illegible]letion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	PID VALUES (ppm)	SAMPLES
0	Asphalt over base course			
	FILL: Brown, silty CLAY with black cinders - CL		0.0 0.0	SS
			0.0 0.0	SS
5	FILL: SAND and GRAVEL		0.0 0.0	SS
			0.0 0.0	SS
10	FILL: Brown and green, silty CLAY, trace gravel - CL		0.0 0.0	SS
	Boring terminated at 11.0 feet			
15				
20				
25				
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 O - QU/2 □ - SV

.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ - BLOWS PER FOOT

WATER CONTENT, %

PL LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESE[NT] [TH]E APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT __ FEET

AT __ AFTER __ HOURS

AT __ AFTER __ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

__ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM __ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: SCB	App'vd. by:
Date: 9-7-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC
ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-10

Project No. 2498.01.3120.02

PLATE

Surface Elevation ___

Datum ___

C[illegible]tion Date: 8-24-93

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	UNIT DRY WEIGHT SPT-VALUE	SAMPLES
	Soft, brown, clayey SILT - ML or CL			
	Medium dense, LIMESTONE cobbles		2-5-3-3	SS
			1-4-3-3	SS
5	Boring terminated at 4.0 feet			
10				
15				
20				
25				
30				
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

.5 1 1.5 2 2.5

STANDARD PENETRATION RESISTANCE (ASTM D 1586)

▲ - BLOWS PER FOOT

PL WATER CONTENT, % LL

10 20 30 40 50

NOTE: STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

ENCOUNTERED AT ___ FEET

AT ___ AFTER ___ HOURS

AT ___ AFTER ___ HOURS

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM ___ FEET

PG DRILLER SLB LOGGER

CME 550 DRILL RIG

REMARKS:

SEE NOTATION SHEET FOR DESCRIPTION OF ABBREVIATIONS

Drawn by: SH	Ck'd. by: ScB	App'vd. by:
Date: 10-4-93	Date: 10/4/93	Date:

GEOTECHNOLOGY, INC

ENGINEERING AND ENVIRONMENTAL SERVICES

HUBERT WHEELER SCHOOL

LOG OF BORING: B-10A

Project No. 2498.01.3120.02	PLATE

APPENDIX C

ANALYTICAL DATA REPORTS

ENVIRONMETRICS

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B5-1.4
LAB ID: 93081291

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	390 μg/kg	U μg/kg
108-95-2	Phenol	390	U
111-44-4	bis(2-chloroethyl)Ether	390	U
95-57-8	2-Chlorophenol	390	U
541-73-1	1,3-Dichlorobenzene	390	U
106-46-7	1,4-Dichlorobenzene	390	U
100-51-6	Benzyl Alcohol	390	U
95-50-1	1,2-Dichlorobenzene	390	U
95-48-7	o-Cresol	390	U
39638-32-9	bis-(2-Chloro2propyl)Ether	390	U
106-44-5	m & p-Cresol	390	U
621-64-7	N-Nitroso-Di-n-propylamine	390	U
67-72-1	Hexachloroethane	390	U
98-95-3	Nitrobenzene	390	U
78-59-1	Isophorone	390	U
88-75-5	2-Nitrophenol	390	U
105-67-9	2,4-Dimethylphenol	390	U
65-85-0	Benzoic Acid	2,000	U
111-91-1	bis(2-Chloroethoxy)methane	390	U
120-83-2	2,4-Dichlorophenol	390	U
120-82-1	1,2,4-Trichlorobenzene	390	U
91-20-3	**Naphthalene**	390	260J
106-47-8	4-Chloroaniline	390	U
87-68-3	Hexachlorobutadiene	390	U
59-50-7	4-Chloro-3-methylphenol	390	U
91-57-6	**2-Methylnaphthalene**	390	160J
77-47-4	Hexachlorocyclopentadiene	390	U
88-06-2	2,4,6-Trichlorophenol	390	U
95-95-4	2,4,5-Trichlorophenol	2,000	U
91-58-7	2-Chloronaphthalene	390	U
88-74-4	2-Nitroaniline	2,000	U
131-11-3	Dimethylphthalate	390	U
103-33-3	Azobenzene	390	U
208-96-8	**Acenaphthylene**	390	71J
606-20-2	2,6-Dinitrotoluene	390	U
99-09-2	3-Nitroaniline	2,000	U
83-32-9	**Acenaphthene**	390	690
51-28-5	2,4-Dinitrophenol	2,000	U

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B4-6.8
LAB ID: 93081290

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	2,000 µg/kg	U µg/kg
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
7005-72-3	4-Chlorophenol phenyl ether	410	U
86-73-7	Fluorene	410	U
100-01-6	4-Nitroaniline	2,000	U
534-52-1	4,6-Dinitro-2-methylphenol	2,000	U
86-30-6	N-Nitrosodiphenylamine	410	U
101-55-3	4-Bromophenyl phenyl ether	410	U
118-74-1	Hexachlorobenzene	410	U
87-86-5	Pentachlorophenol	2,000	U
85-01-8	Phenanthrene	410	120J
120-12-7	Anthracene	410	U
84-74-2	Carbazole	410	U
84-74-2	Di-n-butylphthalate	410	81[illegible]J
206-44-0	Fluoranthene	410	120J
92-87-4	Benzidine	410	U
129-00-0	Pyrene	410	106J
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3'-Dichlorobenzidine	410	U
56-55-3	Benzo(a)anthracene	410	U
218-01-9	Chrysene	410	56J
117-81-7	bis(2-Ethylhexyl)phthalate	410	U
117-84-0	Di-n-octylphthalate	410	U
205-99-2	Benzo(b)fluoranthene	410	89J
207-08-9	Benzo(k)fluoranthene	410	U
50-32-8	Benzo(a)pyrene	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
53-70-3	Dibenzo(a,h)anthracene	410	U
191-24-2	Benzo(g,h,i)perylene	410	U

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL
QUANTITATION LIMIT

SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/08/93

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B3-3.5
LAB ID: 93081289

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	2,200 µg/kg	U µg/kg
132-64-9	Dibenzofuran	430	85J
121-14-2	2,4-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	430	U
7005-72-3	4-Chlorophenol phenyl ether	430	U
86-73-7	Fluorene	430	130J
100-01-6	4-Nitroaniline	2,200	U
534-52-1	4,6-Dinitro-2-methylphenol	2,200	U
86-30-6	N-Nitrosodiphenylamine	430	U
101-55-3	4-Bromophenyl phenyl ether	430	U
118-74-1	Hexachlorobenzene	430	U
87-86-5	Pentachlorophenol	2,200	U
85-01-8	Phenanthrene	430	1,800
120-12-7	Anthracene	430	350J
84-74-2	Carbazole	430	160J
84-74-2	Di-n-butylphthalate	430	58BJ
206-44-0	Fluoranthene	430	2,400
92-87-4	Benzidine	430	U
129-00-0	Pyrene	430	2,500
85-68-7	Butylbenzylphthalate	430	U
91-94-1	3,3'-Dichlorobenzidine	430	U
56-55-3	Benzo(a)anthracene	430	1,200
218-01-9	Chrysene	430	1,300
117-81-7	bis(2-Ethylhexyl)phthalate	430	U
117-84-0	Di-n-octylphthalate	430	U
205-99-2	Benzo(b)fluoranthene	430	1,900
207-08-9	Benzo(k)fluoranthene	430	520
50-32-8	Benzo(a)pyrene	430	1,070
193-39-5	Indeno(1,2,3-cd)pyrene	430	570
53-70-3	Dibenzo(a,h)anthracene	430	170J
191-24-2	Benzo(g,h,i)perylene	430	560

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
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DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/08/93

WCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B4-6.8
LAB ID: 93081290

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	410 µg/kg	U µg/kg
108-95-2	Phenol	410	U
111-44-4	bis(2-chloroethyl)Ether	410	U
95-57-8	2-Chlorophenol	410	U
541-73-1	1,3-Dichlorobenzene	410	U
106-46-7	1,4-Dichlorobenzene	410	U
100-51-6	Benzyl Alcohol	410	U
95-50-1	1,2-Dichlorobenzene	410	U
95-48-7	o-Cresol	410	U
39638-32-9	bis-(2-Chloro2propyl)Ether	410	U
106-44-5	m & p-Cresol	410	U
621-64-7	N-Nitroso-Di-n-propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
88-75-5	2-Nitrophenol	410	U
105-67-9	2,4-Dimethylphenol	410	U
65-85-0	Benzoic Acid	2,000	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
120-83-2	2,4-Dichlorophenol	410	U
120-82-1	1,2,4-Trichlorobenzene	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
59-50-7	4-Chloro-3-methylphenol	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
88-06-2	2,4,6-Trichlorophenol	410	U
95-95-4	2,4,5-Trichlorophenol	2,000	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	2,000	U
131-11-3	Dimethylphthalate	410	U
103-33-3	Azobenzene	410	U
208-96-8	Acenaphthylene	410	U
606-20-2	2,6-Dinitrotoluene	410	U
99-09-2	3-Nitroaniline	2,000	U
83-32-9	Acenaphthene	410	U
51-28-5	2,4-Dinitrophenol	2,000	U

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ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B2-8.10
LAB ID: 93081288

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	2,000 µg/kg	U µg/kg
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenol phenyl ether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	2,000	U
534-52-1	4,6-Dinitro-2-methylphenol	2,000	U
86-30-6	N-Nitrosodiphenylamine	400	U
101-55-3	4-Bromophenyl phenyl ether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	2,000	U
85-01-8	Phenanthrene	400	320J
120-12-7	Anthracene	400	U
84-74-2	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	150BJ
206-44-0	Fluoranthene	400	310
92-87-4	Benzidine	400	U
129-00-0	Pyrene	400	280J
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	130J
218-01-9	Chrysene	400	160J
117-81-7	bis(2-Ethylhexyl)phthalate	400	U
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	200J
207-08-9	Benzo(k)fluoranthene	400	74J
50-32-8	Benzo(a)pyrene	400	98J
193-39-5	Indeno(1,2,3-cd)pyrene	400	82J
53-70-3	Dibenzo(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	77J

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/23/93
DATE RECEIVED : 8/25/93
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DATE ANALYZED : 9/08/93

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

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GEOTECHNOLOGY, INC.
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ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B3-3.5
LAB ID: 93081289

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	430 µg/kg	U µg/kg
108-95-2	Phenol	430	U
111-44-4	bis(2-chloroethyl)Ether	430	U
95-57-8	2-Chlorophenol	430	U
541-73-1	1,3-Dichlorobenzene	430	U
106-46-7	1,4-Dichlorobenzene	430	U
100-51-6	Benzyl Alcohol	430	U
95-50-1	1,2-Dichlorobenzene	430	U
95-48-7	o-Cresol	430	U
39638-32-9	bis-(2-Chloro2propyl)Ether	430	U
106-44-5	m & p-Cresol	430	U
621-64-7	N-Nitroso-Di-n-propylamine	430	U
67-72-1	Hexachloroethane	430	U
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	430	U
65-85-0	Benzoic Acid	2,200	U
111-91-1	bis(2-Chloroethoxy)methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
120-82-1	1,2,4-Trichlorobenzene	430	U
91-20-3	Naphthalene	430	U
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	430	U
59-50-7	4-Chloro-3-methylphenol	430	U
91-57-6	2-Methylnaphthalene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	2,200	U
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	2,200	U
131-11-3	Dimethylphthalate	430	U
103-33-3	Azobenzene	430	U
208-96-8	Acenaphthylene	430	80J
606-20-2	2,6-Dinitrotoluene	430	U
99-09-2	3-Nitroaniline	2,200	U
83-32-9	Acenaphthene	430	150J
51-28-5	2,4-Dinitrophenol	2,200	U

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2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2498-B1-3.7
LAB ID: 93081287

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	2,100 μg/kg	U μg/kg
132-64-9	Dibenzofuran	420	610
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
7005-72-3	4-Chlorophenol phenyl ether	420	U
86-73-7	Fluorene	420	1,300
100-01-6	4-Nitroaniline	2,100	U
534-52-1	4,6-Dinitro-2-methylphenol	2,100	U
86-30-6	N-Nitrosodiphenylamine	420	U
101-55-3	4-Bromophenyl phenyl ether	420	U
118-74-1	Hexachlorobenzene	420	U
87-86-5	Pentachlorophenol	2,100	U
85-01-8	Phenanthrene	4,200	12,000
120-12-7	Anthracene	420	2,900
84-74-2	Carbazole	420	1,400
84-74-2	Di-n-butylphthalate	420	170BJ
206-44-0	Fluoranthene	4,200	13,000
92-87-4	Benzidine	420	U
129-00-0	Pyrene	4,200	8,600
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	5,000
218-01-9	Chrysene	420	4,200
117-81-7	bis(2-Ethylhexyl)phthalate	420	U
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	5,300
207-08-9	Benzo(k)fluoranthene	420	1,700
50-32-8	Benzo(a)pyrene	420	3,800
193-39-5	Indeno(1,2,3-cd)pyrene	420	1,800
53-70-3	Dibenzo(a,h)anthracene	420	460
191-24-2	Benzo(g,h,i)perylene	420	1,600

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/23/93
DATE RECEIVED : 8/25/93
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/08 & 10/93

WAYNE L. COOPER
LABORATORY DIRECTOR

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2345 Millpark Drive
Maryland Heights, MO 63043
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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B2-8.10
LAB ID: 93081288

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	400 µg/kg	U µg/kg
108-95-2	Phenol	400	U
111-44-4	bis(2-chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
100-51-6	Benzyl Alcohol	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	o-Cresol	400	U
39638-32-9	bis-(2-Chloro2propyl)Ether	400	U
106-44-5	m & p-Cresol	400	U
621-64-7	N-Nitroso-Di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
65-85-0	Benzoic Acid	2,000	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	2,000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	2,000	U
131-11-3	Dimethylphthalate	400	U
103-33-3	Azobenzene	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	2,000	U
83-32-9	Acenaphthene	400	U
51-28-5	2,4-Dinitrophenol	2,000	U

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: METHOD BLANK
LAB ID: SASBLK3899

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	1,700 µg/kg	U µg/kg
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenol phenyl ether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	1,700	U
534-52-1	4,6-Dinitro-2-methylphenol	1,700	U
86-30-6	N-Nitrosodiphenylamine	330	U
101-55-3	4-Bromophenyl phenyl ether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	1,700	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
84-74-2	Carbazole	330	U
84-74-2	Di-n-butylphthalate	330	88BJ
206-44-0	Fluoranthene	330	U
92-87-4	Benzidine	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)phthalate	330	76BJ
117-84-0	Di-n-octylphthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenzo(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

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QUANTITATION LIMIT

SEPTEMBER 15, 1993

DATE COLLECTED : ---
DATE RECEIVED : ---
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/08/93

WAYNE L. COOPER
LABORATORY DIRECTOR

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2345 Millpark Drive
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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE , SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2498-B1-3.7
LAB ID: 93081287

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	420 µg/kg	U µg/kg
108-95-2	Phenol	420	U
111-44-4	bis(2-chloroethyl)Ether	420	U
95-57-8	2-Chlorophenol	420	U
541-73-1	1,3-Dichlorobenzene	420	U
106-46-7	1,4-Dichlorobenzene	420	U
100-51-6	Benzyl Alcohol	420	U
95-50-1	1,2-Dichlorobenzene	420	U
95-48-7	o-Cresol	420	U
39638-32-9	bis-(2-Chloro2propyl)Ether	420	U
106-44-5	m & p-Cresol	420	U
621-64-7	N-Nitroso-Di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
88-75-5	2-Nitrophenol	420	U
105-67-9	2,4-Dimethylphenol	420	U
65-85-0	Benzoic Acid	2,100	U
111-91-1	bis(2-Chloroethoxy)methane	420	U
120-83-2	2,4-Dichlorophenol	420	U
120-82-1	1,2,4-Trichlorobenzene	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
87-68-3	Hexachlorobutadiene	420	U
59-50-7	4-Chloro-3-methylphenol	420	U
91-57-6	2-Methylnaphthalene	420	55J
77-47-4	Hexachlorocyclopentadiene	420	U
88-06-2	2,4,6-Trichlorophenol	420	U
95-95-4	2,4,5-Trichlorophenol	2,100	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	2,100	U
131-11-3	Dimethylphthalate	420	U
103-33-3	Azobenzene	420	U
208-96-8	Acenaphthylene	420	72J
606-20-2	2,6-Dinitrotoluene	420	U
99-09-2	3-Nitroaniline	2,100	U
83-32-9	Acenaphthene	420	1,040
51-28-5	2,4-Dinitrophenol	2,100	U

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B9-7.9
LAB ID: 93081296

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	10
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	100[redacted]
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	93
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	7.9
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	42

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/03/93

WAYNE L. COOPER
LABORATORY DIRECTOR

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ENVIROMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: METHOD BLANK
LAB ID: SASBLK3899

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	330 µg/kg	U µg/kg
108-95-2	Phenol	330	U
111-44-4	bis(2-chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
100-51-6	Benzyl Alcohol	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	o-Cresol	330	U
39638-32-9	bis-(2-Chloro2propyl)Ether	330	U
106-44-5	m & p-Cresol	330	U
621-64-7	N-Nitroso-Di-n-propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
65-85-0	Benzoic Acid	1,700	220BJ
111-91-1	bis(2-Chloroethoxy)methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	1,700	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	1,700	U
131-11-3	Dimethylphthalate	330	U
103-33-3	Azobenzene	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	1,700	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	1,700	U

ENVIRO-METRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B10-1.3
LAB ID: 93081294

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	70
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/02/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B8-1.3
LAB ID: 93081295

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	120[illegible]
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	12
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	7.4

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DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/03/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B6-3.5
LAB ID: 93081292

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	61[illegible]
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

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DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/03/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

60

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B7-6.8
LAB ID: 93081293

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	120
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

U = UNDETECTED
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61

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/02/93

SEPTEMBER 15, 1993

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B4-6.8
LAB ID: 93081290

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 μg/kg	U μg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	76[redacted]
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	6.5
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	5.8

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DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/03/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

62

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B5-1.4
LAB ID: 93081291

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	140
67-64-1	Acetone	100	120
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	14
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	12

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

63

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/02/93

SEPTEMBER 15, 1993

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
?258 GRISSOM DRIVE
T. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B3-3.5
LAB ID: 93081289

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	11 µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	110
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
7-66-3	Chloroform	5	U
.07-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	18
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	11

U = UNDETECTED
~ = PRESENT IN BLANK
= DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/02/93

SEPTEMBER 15, 1993

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

64

EN RO ..ETR CS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B2-8.10
LAB ID: 93081288

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	41
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	6.2
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	5

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT
DATE COLLECTED : 8/23/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/02/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

5

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: 2498-B1-3.7
LAB ID: 93081287

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	50 µg/kg	U µg/kg
74-83-9	Bromomethane	50	U
85-01-4	Vinyl Chloride	50	U
75-00-3	Chloroethane	50	U
75-09-2	Methylene Chloride	25	144B
67-64-1	Acetone	500	U
107-02-8	Acrolein	500	U
75-15-0	Carbon Disulfide	500	U
107-13-1	Acrylonitrile	500	U
75-69-04	Trichlorofluoromethane	50	U
75-35-4	1,1-Dichloroethene	25	U
75-34-3	1,1-Dichloroethane	25	U
540-59-0	1,2-Dichloroethene (Total)	25	U
67-66-3	Chloroform	25	U
107-06-2	1,2-Dichloroethane	25	U
78-93-3	2-Butanone	500	U
71-55-6	1,1,1-Trichloroethane	25	U
56-23-5	Carbon Tetrachloride	25	U
108-05-4	Vinyl Acetate	250	U
75-27-4	Bromodichloromethane	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	cis-1,3-Dichloropropene	25	U
79-01-6	Trichloroethene	25	U
124-48-1	Dibromochloromethane	25	U
79-00-5	1,1,2-Trichloroethane	25	U
71-43-2	Benzene	25	U
10061-02-6	trans-1,3-Dichloropropene	25	U
75-25-2	Bromoform	25	U
108-10-1	4-Methyl-2-Pentanone	250	U
591-78-6	2-Hexanone	250	U
127-18-4	Tetrachloroethene	25	U
79-34-5	1,1,2,2-Tetrachloroethane	25	U
108-88-3	Toluene	25	U
108-90-7	Chlorobenzene	25	U
100-41-4	Ethylbenzene	25	67
100-42-5	Styrene	25	U
1330-20-7	Xylene (Total)	25	34

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED : 8/23/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/03/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: METHOD BLANK
LAB ID: VCBLK245A

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 µg/kg	U µg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	5.6B
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT
DATE COLLECTED : ---
DATE RECEIVED : ---
DATE ANALYZED : 9/03/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
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ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

DIOXIN 2,3,7,8-TCDD

LAB NO.	IDENTIFICATION	DETECTION LIMIT	RESULTS
BLANK	SOIL BLANK	0.300 NG/GM	U NG/GM
93081295	2498-B8-1.3 8/24/93	0.300 NG/GM	U NG/GM
93081296	2498-B9-7.9 8/24/93	0.300 NG/GM	U NG/GM

SEPTEMBER 15, 1993

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WAYNE L. COOPER
LABORATORY DIRECTOR

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(314) 427-0550

ATTN: SAM BRENNEKE

VOLATILE ORGANIC ANALYSIS
METHOD SW-846 8240

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL
SAMPLE ID: METHOD BLANK
LAB ID: VCBLK244A

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
74-87-3	Chloromethane	10 μg/kg	U μg/kg
74-83-9	Bromomethane	10	U
85-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	100	U
107-02-8	Acrolein	100	U
75-15-0	Carbon Disulfide	100	U
107-13-1	Acrylonitrile	100	U
75-69-04	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (Total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	100	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	50	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	50	U
591-78-6	2-Hexanone	50	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (Total)	5	U

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT
DATE COLLECTED : ---
DATE RECEIVED : ---
DATE ANALYZED : 9/02/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B9-7.9
LAB ID: 93081296
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	6.93	
BERYLLIUM	SW-846 6010	0.565	
CADMIUM	SW-846 6010	0.865	
CHROMIUM	SW-846 6010	13.2	
COPPER	SW-846 6010	20.2	
LEAD	SW-846 6010	115	
MERCURY	SW-846 7471	0.11	
NICKEL	SW-846 6010	18.3	
SELENIUM	SW-846 7740	0.530	
SILVER	SW-846 6010	0.720	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	98.0	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

7(

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B10-1.3
LAB ID: 93081294
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	7.42	
BERYLLIUM	SW-846 6010	0.514	
CADMIUM	SW-846 6010	1.77	
CHROMIUM	SW-846 6010	9.62	
COPPER	SW-846 6010	13.3	
LEAD	SW-846 6010	33.6	
MERCURY	SW-846 7471	0.39	
NICKEL	SW-846 6010	13.7	
SELENIUM	SW-846 7740	<0.250	
SILVER	SW-846 6010	0.986	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	44.5	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63141

ENV RO _ _ETR CS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: SAME BRENNEKE

INVOICE # 23079
PO # 6575

TCLP SPIKE RECOVERY FORM

METALS

SAMPLE ID: 2498-B8-1.3
LAB ID: 93081295
DATE COLLECTED: 08/24/93

ELEMENT	SAMPLE RESULT MG/L	SPIKE LEVEL MG/L	SPIKE RESULT MG/L	PERCENT RECOVERY
LEAD	0.123	5.0	4.592	89

$$\text{PERCENT RECOVERY} = \frac{\text{(SPIKE RESULT - SAMPLE RESULT)}}{\text{SPIKE LEVEL}} \times 100$$

73

2345 ... Drive
Maryland Heights, MO 63043
(314) 427-0550

CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

COC # 10021

...MPANY Geotechnology
...DRESS
...Y/STATE/ZIP
...ONE ( ) 997-7440
...RN AROUND TIME/INSTRUCTIONS:

CONTACT Sam Brenneke
DATE 9-20-93
DUE DATE 9-24-93
FAX ( )

PROPOSAL # G634
PROJECT #
PO # 6575
PAGE ___ OF ___

SAMPLE IDENTIFICATION

ITEM	FOR LAB USE ONLY	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	TCLP Pb
1	9308129S	2498-BB-1.3	8-24-93	—	1 qt glass	X
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

RE-Log

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER	COMMENTS:
				Sonny Parks	9/20	845	Log In	
1	Christopher M. Wolfe	9/20	8:50	Mary Pikser	9/20/93	8:50	TCLP	
1	Mary Pikser	9/20/93	11:10	Christopher M. Wolfe			Return	

ENVIRONMETRICS
2345 Millpark Drive
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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B8-1.3
LAB ID: 93081295
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	9.55	
BERYLLIUM	SW-846 6010	0.408	
CADMIUM	SW-846 6010	0.806	
CHROMIUM	SW-846 6010	12.0	
COPPER	SW-846 6010	13.9	
LEAD	SW-846 6010	338	
MERCURY	SW-846 7471	<0.10	
NICKEL	SW-846 6010	11.6	
SELENIUM	SW-846 7740	0.520	
SILVER	SW-846 6010	<0.560	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	163	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63141

ATTN: SAME BRENNEKE

INVOICE # 23079
PO # 6575

ANALYSIS RESULTS

SAMPLE ID: 2498-B8-1.3
LAB ID: 93081295
DATE COLLECTED: 08/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS
TCLP EXTRACTION	SW-846 1311	
METALS ANALYSIS	SW-846 6010	EXTRACTION
LEAD		0.123 mg/l

OCT - 1 1993

SEPTEMBER 24, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

75

ENVIRONMETRICS
2345 Millpark Drive
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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B6-3.5
LAB ID: 93081292
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	8.81	
BERYLLIUM	SW-846 6010	0.387	
CADMIUM	SW-846 6010	1.22	
CHROMIUM	SW-846 6010	62.2	
COPPER	SW-846 6010	54.5	
LEAD	SW-846 6010	308	
MERCURY	SW-846 7471	0.63	
NICKEL	SW-846 6010	13.8	
SELENIUM	SW-846 7740	0.332	
SILVER	SW-846 6010	<0.478	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	232	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	1.03	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

2345 Millpark Drive
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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B7-6.8
LAB ID: 93081293
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	8.97	
BERYLLIUM	SW-846 6010	0.693	
CADMIUM	SW-846 6010	0.713	
CHROMIUM	SW-846 6010	18.6	
COPPER	SW-846 6010	15.3	
LEAD	SW-846 6010	14.5	
MERCURY	SW-846 7471	<0.10	
NICKEL	SW-846 6010	19.8	
SELENIUM	SW-846 7740	<0.250	
SILVER	SW-846 6010	<0.513	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	50.6	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

77

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ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B4-6.8
LAB ID: 93081290
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	7.95	
BERYLLIUM	SW-846 6010	0.646	
CADMIUM	SW-846 6010	0.581	
CHROMIUM	SW-846 6010	21.0	
COPPER	SW-846 6010	13.3	
LEAD	SW-846 6010	40.7	
MERCURY	SW-846 7471	<0.10	
NICKEL	SW-846 6010	16.8	
SELENIUM	SW-846 7740	<0.250	
SILVER	SW-846 6010	0.586	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	64.6	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
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(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B5-1.4
LAB ID: 93081291
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	6.07	
BERYLLIUM	SW-846 6010	0.335	
CADMIUM	SW-846 6010	0.656	
CHROMIUM	SW-846 6010	12.2	
COPPER	SW-846 6010	9.68	
LEAD	SW-846 6010	79.9	
MERCURY	SW-846 7471	0.26	
NICKEL	SW-846 6010	10.9	
SELENIUM	SW-846 7740	<0.250	
SILVER	SW-846 6010	<0.459	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	80.8	
TOTAL CYANIDE	SW-846 9010	0.20	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

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ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B2-8.10
LAB ID: 93081288
DATE COLLECTED: 8/23/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	7.97	
BERYLLIUM	SW-846 6010	0.620	
CADMIUM	SW-846 6010	0.907	
CHROMIUM	SW-846 6010	18.9	
COPPER	SW-846 6010	29.4	
LEAD	SW-846 6010	139	
MERCURY	SW-846 7471	0.47	
NICKEL	SW-846 6010	18.9	
SELENIUM	SW-846 7740	0.391	
SILVER	SW-846 6010	0.729	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	113	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENV RO _ _ETR CS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B3-3.5
LAB ID: 93081289
DATE COLLECTED: 8/24/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	7.65	
BERYLLIUM	SW-846 6010	0.852	
CADMIUM	SW-846 6010	1.34	
CHROMIUM	SW-846 6010	13.7	
COPPER	SW-846 6010	35.5	
LEAD	SW-846 6010	303	
MERCURY	SW-846 7471	0.25	
NICKEL	SW-846 6010	17.9	
SELENIUM	SW-846 7740	0.635	
SILVER	SW-846 6010	<0.513	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	293	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

WLCooper
WAYNE L. COOPER
LABORATORY DIRECTOR

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EN_V RO _ _ETR CS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

Mr. Sam Brenneke
Geotechnology
2258 Grissom Dr.
St. Louis, MO 63146

Dear Sir:

Samples labeled 2498-b1 thru 10 were submitted on 25 August, 1993 for semivolatile analysis method SW 846 8270. The method blank extracted with the samples did not meet surrogate criteria for 2-Fluorophenol and 2,4,6-Tribromophenol. According to the method the samples must be re-extracted along with a new method blank. However, because the samples were taken on 23 and 24 August, 93, extracted on 2 Sept, 1993, and analyzed on 8 Sept, 1993, they could not be re-extracted within the required holding times. The samples themselves met the method criteria for surrogates. Further, the reason for low surrogates in the method blank was found to be the sand which is used to simulate a matrix within the blank. Sand is not a requirement for the method blank and will not be used until the problem associated with the sand can be solved. The affect upon the surrogates was not present when method blanks were extracted without sand.

Since the samples did not contain Environmetric's blank sand and met the method criteria for surrogates, the data was judged to be valid and acceptable for a sight assessment.

We apologize for any inconvenience this may have caused you. If you have any questions concerning the data, feel free to contact John Walsh (GC/MS Coordinator) at 427-0550.

John Walsh
John Walsh
GC/MS

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SEP 20 1993
GEOTECHNOLOGY

ENVIRONMETRICS
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(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

ANALYSIS RESULTS

SAMPLE ID: 2498-B1-3.7
LAB ID: 93081287
DATE COLLECTED: 8/23/93

TEST PERFORMED	METHOD OF ANALYSIS	RESULTS	
METALS ANALYSIS		TOTAL	
ANTIMONY	SW-846 7041	<3.00	mg/kg
ARSENIC	SW-846 7060	4.33	
BERYLLIUM	SW-846 6010	0.525	
CADMIUM	SW-846 6010	0.830	
CHROMIUM	SW-846 6010	14.9	
COPPER	SW-846 6010	17.6	
LEAD	SW-846 6010	192	
MERCURY	SW-846 7471	0.14	
NICKEL	SW-846 6010	15.8	
SELENIUM	SW-846 7740	<0.250	
SILVER	SW-846 6010	0.500	
THALLIUM	SW-846 7841	<0.50	
ZINC	SW-846 6010	114	
TOTAL CYANIDE	SW-846 9010	<0.2	mg/kg
PHENOLS	SW-846 9065	<1.0	mg/kg

SEPTEMBER 15, 1993

W L Cooper

WAYNE L. COOPER
LABORATORY DIRECTOR

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EN RO __ETR CS

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B5-1.4
LAB ID: 93081291

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	2,000 µg/kg	U µg/kg
132-64-9	Dibenzofuran	390	440
121-14-2	2,4-Dinitrotoluene	390	U
84-66-2	Diethylphthalate	390	U
7005-72-3	4-Chlorophenol phenyl ether	390	U
86-73-7	Fluorene	390	570
100-01-6	4-Nitroaniline	2,000	U
534-52-1	4,6-Dinitro-2-methylphenol	2,000	U
86-30-6	N-Nitrosodiphenylamine	390	U
101-55-3	4-Bromophenyl phenyl ether	390	U
118-74-1	Hexachlorobenzene	390	U
87-86-5	Pentachlorophenol	2,000	U
85-01-8	Phenanthrene	390	6,100
120-12-7	Anthracene	390	1,200
84-74-2	Carbazole	390	820
84-74-2	Di-n-butylphthalate	390	U
206-44-0	Fluoranthene	3,900	8,400
92-87-4	Benzidine	390	U
129-00-0	Pyrene	3,900	6,400
85-68-7	Butylbenzylphthalate	390	U
91-94-1	3,3'-Dichlorobenzidine	390	U
56-55-3	Benzo(a)anthracene	390	3,400
218-01-9	Chrysene	390	3,300
117-81-7	bis(2-Ethylhexyl)phthalate	390	50BJ
117-84-0	Di-n-octylphthalate	390	U
205-99-2	Benzo(b)fluoranthene	390	5,200
207-08-9	Benzo(k)fluoranthene	390	450
50-32-8	Benzo(a)pyrene	390	3,000
193-39-5	Indeno(1,2,3-cd)pyrene	390	1,400
53-70-3	Dibenzo(a,h)anthracene	390	420
191-24-2	Benzo(g,h,i)perylene	390	1,400

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/08 & 10/93

WLCooper
WAYNE L. COOPER
LABORATORY DIRECTOR

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2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B6-3.5
LAB ID: 93081292

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	39,000 μg/kg	U μg/kg
108-95-2	Phenol	39,000	U
111-44-4	bis(2-chloroethyl)Ether	39,000	U
95-57-8	2-Chlorophenol	39,000	U
541-73-1	1,3-Dichlorobenzene	39,000	U
106-46-7	1,4-Dichlorobenzene	39,000	U
100-51-6	Benzyl Alcohol	39,000	U
95-50-1	1,2-Dichlorobenzene	39,000	U
95-48-7	o-Cresol	39,000	U
39638-32-9	bis-(2-Chloro2propyl)Ether	39,000	U
106-44-5	m & p-Cresol	39,000	U
621-64-7	N-Nitroso-Di-n-propylamine	39,000	U
67-72-1	Hexachloroethane	39,000	U
98-95-3	Nitrobenzene	39,000	U
78-59-1	Isophorone	39,000	U
88-75-5	2-Nitrophenol	39,000	U
105-67-9	2,4-Dimethylphenol	39,000	U
65-85-0	Benzoic Acid	200,000	U
111-91-1	bis(2-Chloroethoxy)methane	39,000	U
120-83-2	2,4-Dichlorophenol	39,000	U
120-82-1	1,2,4-Trichlorobenzene	39,000	U
91-20-3	Naphthalene	39,000	U
106-47-8	4-Chloroaniline	39,000	U
87-68-3	Hexachlorobutadiene	39,000	U
59-50-7	4-Chloro-3-methylphenol	39,000	U
91-57-6	2-Methylnaphthalene	39,000	U
77-47-4	Hexachlorocyclopentadiene	39,000	U
88-06-2	2,4,6-Trichlorophenol	39,000	U
95-95-4	2,4,5-Trichlorophenol	200,000	U
91-58-7	2-Chloronaphthalene	39,000	U
88-74-4	2-Nitroaniline	200,000	U
131-11-3	Dimethylphthalate	39,000	U
103-33-3	Azobenzene	39,000	U
208-96-8	Acenaphthylene	39,000	U
606-20-2	2,6-Dinitrotoluene	39,000	U
99-09-2	3-Nitroaniline	200,000	U
83-32-9	Acenaphthene	39,000	U
51-28-5	2,4-Dinitrophenol	200,000	U

ENVIRONMETRICS
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(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B6-3.5
LAB ID: 93081292

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	200,000 µg/kg	U µg/kg
132-64-9	Dibenzofuran	39,000	U
121-14-2	2,4-Dinitrotoluene	39,000	U
84-66-2	Diethylphthalate	39,000	U
7005-72-3	4-Chlorophenol phenyl ether	39,000	U
86-73-7	Fluorene	39,000	U
100-01-6	4-Nitroaniline	200,000	U
534-52-1	4,6-Dinitro-2-methylphenol	200,000	U
86-30-6	N-Nitrosodiphenylamine	39,000	U
101-55-3	4-Bromophenyl phenyl ether	39,000	U
118-74-1	Hexachlorobenzene	39,000	U
87-86-5	Pentachlorophenol	200,000	U
85-01-8	Phenanthrene	39,000	33,000J
120-12-7	Anthracene	39,000	7,200J
84-74-2	Carbazole	39,000	U
84-74-2	Di-n-butylphthalate	39,000	U
206-44-0	Fluoranthene	39,000	36,000J
92-87-4	Benzidine	39,000	U
129-00-0	Pyrene	39,000	35,000J
85-68-7	Butylbenzylphthalate	39,000	U
91-94-1	3,3'-Dichlorobenzidine	39,000	U
56-55-3	Benzo(a)anthracene	39,000	14,000J
218-01-9	Chrysene	39,000	15,000J
117-81-7	bis(2-Ethylhexyl)phthalate	39,000	U
117-84-0	Di-n-octylphthalate	39,000	U
205-99-2	Benzo(b)fluoranthene	39,000	16,000J
207-08-9	Benzo(k)fluoranthene	39,000	7,000J
50-32-8	Benzo(a)pyrene	39,000	13,000J
193-39-5	Indeno(1,2,3-cd)pyrene	39,000	5,500J
53-70-3	Dibenzo(a,h)anthracene	39,000	U
191-24-2	Benzo(g,h,i)perylene	39,000	5,100J

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/08/93

SEPTEMBER 15, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B7-6.8
LAB ID: 93081293

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	420 µg/kg	U µg/kg
108-95-2	Phenol	420	U
111-44-4	bis(2-chloroethyl)Ether	420	U
95-57-8	2-Chlorophenol	420	U
541-73-1	1,3-Dichlorobenzene	420	U
106-46-7	1,4-Dichlorobenzene	420	U
100-51-6	Benzyl Alcohol	420	U
95-50-1	1,2-Dichlorobenzene	420	U
95-48-7	o-Cresol	420	U
39638-32-9	bis-(2-Chloro2propyl)Ether	420	U
106-44-5	m & p-Cresol	420	U
621-64-7	N-Nitroso-Di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
88-75-5	2-Nitrophenol	420	U
105-67-9	2,4-Dimethylphenol	420	U
65-85-0	Benzoic Acid	2,100	U
111-91-1	bis(2-Chloroethoxy)methane	420	U
120-83-2	2,4-Dichlorophenol	420	U
120-82-1	1,2,4-Trichlorobenzene	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
87-68-3	Hexachlorobutadiene	420	U
59-50-7	4-Chloro-3-methylphenol	420	U
91-57-6	2-Methylnaphthalene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
88-06-2	2,4,6-Trichlorophenol	420	U
95-95-4	2,4,5-Trichlorophenol	2,100	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	2,100	U
131-11-3	Dimethylphthalate	420	U
103-33-3	Azobenzene	420	U
208-96-8	Acenaphthylene	420	U
606-20-2	2,6-Dinitrotoluene	420	U
99-09-2	3-Nitroaniline	2,100	U
83-32-9	Acenaphthene	420	U
51-28-5	2,4-Dinitrophenol	2,100	U

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ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B7-6.8
LAB ID: 93081293

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	2,100 µg/kg	U µg/kg
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
7005-72-3	4-Chlorophenol phenyl ether	420	U
86-73-7	Fluorene	420	U
100-01-6	4-Nitroaniline	2,100	U
534-52-1	4,6-Dinitro-2-methylphenol	2,100	U
86-30-6	N-Nitrosodiphenylamine	420	U
101-55-3	4-Bromophenyl phenyl ether	420	U
118-74-1	Hexachlorobenzene	420	U
87-86-5	Pentachlorophenol	2,100	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
84-74-2	Carbazole	420	U
84-74-2	Di-n-butylphthalate	420	U
206-44-0	Fluoranthene	420	U
92-87-4	Benzidine	420	U
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	bis(2-Ethylhexyl)phthalate	420	U
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
50-32-8	Benzo(a)pyrene	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
53-70-3	Dibenzo(a,h)anthracene	420	U
191-24-2	Benzo(g,h,i)perylene	420	U

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/08/93

SEPTEMBER 15, 1993

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

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ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B8-1.3
LAB ID: 93081295

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	400 µg/kg	U µg/kg
108-95-2	Phenol	400	U
111-44-4	bis(2-chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
100-51-6	Benzyl Alcohol	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	o-Cresol	400	U
39638-32-9	bis-(2-Chloro2propyl)Ether	400	U
106-44-5	m & p-Cresol	400	U
621-64-7	N-Nitroso-Di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
65-85-0	Benzoic Acid	2,000	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	160J
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	150J
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	2,000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	2,000	U
131-11-3	Dimethylphthalate	400	U
103-33-3	Azobenzene	400	U
208-96-8	Acenaphthylene	400	110J
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	2,000	U
83-32-9	Acenaphthene	400	2,100
51-28-5	2,4-Dinitrophenol	2,000	U

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ENVIRONMETRICS
2345 Millpark Drive
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2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B8-1.3
LAB ID: 93081295

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	2,000 µg/kg	U µg/kg
132-64-9	Dibenzofuran	400	1,200
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenol phenyl ether	400	U
86-73-7	Fluorene	400	2,300
100-01-6	4-Nitroaniline	2,000	U
534-52-1	4,6-Dinitro-2-methylphenol	2,000	U
86-30-6	N-Nitrosodiphenylamine	400	U
101-55-3	4-Bromophenyl phenyl ether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	2,000	U
85-01-8	Phenanthrene	4,000	23,000
120-12-7	Anthracene	4,000	6,500
84-74-2	Carbazole	400	3,000
84-74-2	Di-n-butylphthalate	400	68BJ
206-44-0	Fluoranthene	4,000	28,000
92-87-4	Benzidine	400	U
129-00-0	Pyrene	4,000	20,000
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	4,000	12,000
218-01-9	Chrysene	4,000	12,000
117-81-7	bis(2-Ethylhexyl)phthalate	400	80BJ
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	4,000	14,000
207-08-9	Benzo(k)fluoranthene	4,000	4,600
50-32-8	Benzo(a)pyrene	4,000	9,800
193-39-5	Indeno(1,2,3-cd)pyrene	400	4,700
53-70-3	Dibenzo(a,h)anthracene	400	1,400
191-24-2	Benzo(g,h,i)perylene	400	4,300

U = UNDETECTED
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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/09 & 10/93

WAYNE L. COOPER
LABORATORY DIRECTOR

90

EI RO _ETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B9-7.9
LAB ID: 93081296

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	6,100 μg/kg	U μg/kg
108-95-2	Phenol	6,100	U
111-44-4	bis(2-chloroethyl)Ether	6,100	U
95-57-8	2-Chlorophenol	6,100	U
541-73-1	1,3-Dichlorobenzene	6,100	U
106-46-7	1,4-Dichlorobenzene	6,100	U
100-51-6	Benzyl Alcohol	6,100	U
95-50-1	1,2-Dichlorobenzene	6,100	U
95-48-7	o-Cresol	6,100	U
39638-32-9	bis-(2-Chloro2propyl)Ether	6,100	U
106-44-5	m & p-Cresol	6,100	U
621-64-7	N-Nitroso-Di-n-propylamine	6,100	U
67-72-1	Hexachloroethane	6,100	U
98-95-3	Nitrobenzene	6,100	U
78-59-1	Isophorone	6,100	U
88-75-5	2-Nitrophenol	6,100	U
105-67-9	2,4-Dimethylphenol	6,100	U
65-85-0	Benzoic Acid	31,000	U
111-91-1	bis(2-Chloroethoxy)methane	6,100	U
120-83-2	2,4-Dichlorophenol	6,100	U
120-82-1	1,2,4-Trichlorobenzene	6,100	U
91-20-3	Naphthalene	6,100	U
106-47-8	4-Chloroaniline	6,100	U
87-68-3	Hexachlorobutadiene	6,100	U
59-50-7	4-Chloro-3-methylphenol	6,100	U
91-57-6	2-Methylnaphthalene	6,100	U
77-47-4	Hexachlorocyclopentadiene	6,100	U
88-06-2	2,4,6-Trichlorophenol	6,100	U
95-95-4	2,4,5-Trichlorophenol	31,000	U
91-58-7	2-Chloronaphthalene	6,100	U
88-74-4	2-Nitroaniline	31,000	U
131-11-3	Dimethylphthalate	6,100	U
103-33-3	Azobenzene	6,100	U
208-96-8	Acenaphthylene	6,100	U
606-20-2	2,6-Dinitrotoluene	6,100	U
99-09-2	3-Nitroaniline	31,000	U
83-32-9	Acenaphthene	6,100	U
51-28-5	2,4-Dinitrophenol	31,000	U

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B9-7.9
LAB ID: 93081296

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	31,000 µg/kg	U µg/kg
132-64-9	Dibenzofuran	6,100	U
121-14-2	2,4-Dinitrotoluene	6,100	U
84-66-2	Diethylphthalate	6,100	U
7005-72-3	4-Chlorophenol phenyl ether	6,100	U
86-73-7	Fluorene	6,100	U
100-01-6	4-Nitroaniline	31,000	U
534-52-1	4,6-Dinitro-2-methylphenol	31,000	U
86-30-6	N-Nitrosodiphenylamine	6,100	U
101-55-3	4-Bromophenyl phenyl ether	6,100	U
118-74-1	Hexachlorobenzene	6,100	U
87-86-5	Pentachlorophenol	31,000	U
85-01-8	Phenanthrene	6,100	U
120-12-7	Anthracene	6,100	U
84-74-2	Carbazole	6,100	U
84-74-2	Di-n-butylphthalate	6,100	U
206-44-0	Fluoranthene	6,100	U
92-87-4	Benzidine	6,100	U
129-00-0	Pyrene	6,100	U
85-68-7	Butylbenzylphthalate	6,100	U
91-94-1	3,3'-Dichlorobenzidine	6,100	U
56-55-3	Benzo(a)anthracene	6,100	U
218-01-9	Chrysene	6,100	U
117-81-7	bis(2-Ethylhexyl)phthalate	6,100	U
117-84-0	Di-n-octylphthalate	6,100	U
205-99-2	Benzo(b)fluoranthene	6,100	U
207-08-9	Benzo(k)fluoranthene	6,100	U
50-32-8	Benzo(a)pyrene	6,100	U
193-39-5	Indeno(1,2,3-cd)pyrene	6,100	U
53-70-3	Dibenzo(a,h)anthracene	6,100	U
191-24-2	Benzo(g,h,i)perylene	6,100	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
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DATE ANALYZED : 9/09/93

WAYNE L. COOPER
LABORATORY DIRECTOR

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE ONE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B10-1.3
LAB ID: 93081294

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
62-75-9	N-Nitrosodimethylamine	12,000 µg/kg	U µg/kg
108-95-2	Phenol	12,000	U
111-44-4	bis(2-chloroethyl)Ether	12,000	U
95-57-8	2-Chlorophenol	12,000	U
541-73-1	1,3-Dichlorobenzene	12,000	U
106-46-7	1,4-Dichlorobenzene	12,000	U
100-51-6	Benzyl Alcohol	12,000	U
95-50-1	1,2-Dichlorobenzene	12,000	U
95-48-7	o-Cresol	12,000	U
39638-32-9	bis-(2-Chloro2propyl)Ether	12,000	U
106-44-5	m & p-Cresol	12,000	U
621-64-7	N-Nitroso-Di-n-propylamine	12,000	U
67-72-1	Hexachloroethane	12,000	U
98-95-3	Nitrobenzene	12,000	U
78-59-1	Isophorone	12,000	U
88-75-5	2-Nitrophenol	12,000	U
105-67-9	2,4-Dimethylphenol	12,000	U
65-85-0	Benzoic Acid	60,000	U
111-91-1	bis(2-Chloroethoxy)methane	12,000	U
120-83-2	2,4-Dichlorophenol	12,000	U
120-82-1	1,2,4-Trichlorobenzene	12,000	U
91-20-3	Naphthalene	12,000	3,900J
106-47-8	4-Chloroaniline	12,000	U
87-68-3	Hexachlorobutadiene	12,000	U
59-50-7	4-Chloro-3-methylphenol	12,000	U
91-57-6	2-Methylnaphthalene	12,000	2,400J
77-47-4	Hexachlorocyclopentadiene	12,000	U
88-06-2	2,4,6-Trichlorophenol	12,000	U
95-95-4	2,4,5-Trichlorophenol	60,000	U
91-58-7	2-Chloronaphthalene	12,000	U
88-74-4	2-Nitroaniline	60,000	U
131-11-3	Dimethylphthalate	12,000	U
103-33-3	Azobenzene	12,000	U
208-96-8	Acenaphthylene	12,000	1,400J
606-20-2	2,6-Dinitrotoluene	12,000	U
99-09-2	3-Nitroaniline	60,000	U
83-32-9	Acenaphthene	12,000	8,200J
51-28-5	2,4-Dinitrophenol	60,000	U

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E V RO METR CS

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: SAM BRENNEKE

SEMIVOLATILE ORGANIC COMPOUNDS
METHOD SW-846 8270
PAGE TWO

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

SAMPLE ID: 2489-B10-1.3
LAB ID: 93081294

CAS NUMBER		PRACTICAL QUANTITATION LIMIT	RESULTS
100-02-7	4-Nitrophenol	60,000 µg/kg	U µg/kg
132-64-9	Dibenzofuran	12,000	4,500J
121-14-2	2,4-Dinitrotoluene	12,000	U
84-66-2	Diethylphthalate	12,000	U
7005-72-3	4-Chlorophenol phenyl ether	12,000	U
86-73-7	Fluorene	12,000	6,700J
100-01-6	4-Nitroaniline	60,000	U
534-52-1	4,6-Dinitro-2-methylphenol	60,000	U
86-30-6	N-Nitrosodiphenylamine	12,000	U
101-55-3	4-Bromophenyl phenyl ether	12,000	U
118-74-1	Hexachlorobenzene	12,000	U
87-86-5	Pentachlorophenol	60,000	U
85-01-8	Phenanthrene	12,000	83,000
120-12-7	Anthracene	12,000	16,000
84-74-2	Carbazole	12,000	12,000J
84-74-2	Di-n-butylphthalate	12,000	U
206-44-0	Fluoranthene	12,000	104,000
92-87-4	Benzidine	12,000	U
129-00-0	Pyrene	12,000	93,000
85-68-7	Butylbenzylphthalate	12,000	U
91-94-1	3,3'-Dichlorobenzidine	12,000	U
56-55-3	Benzo(a)anthracene	12,000	45,000
218-01-9	Chrysene	12,000	54,000
117-81-7	bis(2-Ethylhexyl)phthalate	12,000	U
117-84-0	Di-n-octylphthalate	12,000	U
205-99-2	Benzo(b)fluoranthene	12,000	62,000
207-08-9	Benzo(k)fluoranthene	12,000	29,000
50-32-8	Benzo(a)pyrene	12,000	41,000
193-39-5	Indeno(1,2,3-cd)pyrene	12,000	19,000
53-70-3	Dibenzo(a,h)anthracene	12,000	6,000J
191-24-2	Benzo(g,h,i)perylene	12,000	18,000

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE EXTRACTED : 9/02/93
DATE ANALYZED : 9/09/93

WAYNE L. COOPER
LABORATORY DIRECTOR

94

E VIRO METR CS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: METHOD BLANK
LAB ID: OP3901

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	1.33 µg/kg	U µg/kg
319-85-7	β-BHC	2.00	U
319-86-8	δ-BHC	3.00	U
58-89-9	γ-BHC (Lindane)	1.33	U
76-44-8	Heptachlor	1.00	U
309-00-2	Aldrin	1.33	U
1024-57-3	Heptachlor epoxide	1.67	U
959-98-8	Endosulfan I	4.67	U
60-57-1	Dieldrin	1.33	U
72-55-9	4,4'-DDE	1.33	U
72-20-8	Endrin	2.00	U
33213-65-9	Endosulfan II	1.33	U
72-54-8	4,4'-DDD	3.67	U
1031-07-8	Endosulfan Sulfate	22.00	U
50-29-3	4,4'-DDT	4.00	U
72-43-5	Methoxychlor	58.67	U
7421-93-4	Endrin aldehyde	7.67	U
12789-03-6	Chlordane	33.33	U
8001-35-2	Toxaphene	166.67	U
12674-11-2	PCB-1016	40.00	U
1104-28-2	PCB-1221	80.00	U
11141-16-5	PCB-1232	40.00	U
53469-21-9	PCB-1242	40.00	U
12672-29-6	PCB-1248	40.00	U
11097-69-1	PCB-1254	40.00	U
11096-82-5	PCB 1260	40.00	U

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SEPTEMBER 15, 1993

DATE COLLECTED : ---
DATE RECEIVED : ---
DATE ANALYZED : 9/08/93

WAYNE L. COOPER
LABORATORY DIRECTOR

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B1-3.7
LAB ID: 93081287

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	3.20 μg/kg	U μg/kg
319-85-7	β-BHC	4.80	U
319-86-8	δ-BHC	7.19	U
58-89-9	γ-BHC (Lindane)	3.20	U
76-44-8	Heptachlor	2.40	U
309-00-2	Aldrin	3.20	U
1024-57-3	Heptachlor epoxide	4.00	U
959-98-8	Endosulfan I	11.19	U
60-57-1	Dieldrin	3.20	U
72-55-9	4,4'-DDE	3.20	U
72-20-8	Endrin	4.80	U
33213-65-9	Endosulfan II	3.20	U
72-54-8	4,4'-DDD	8.79	U
1031-07-8	Endosulfan Sulfate	52.76	U
50-29-3	4,4'-DDT	9.59	U
72-43-5	Methoxychlor	140.68	U
7421-93-4	Endrin aldehyde	18.38	U
12789-03-6	Chlordane	79.93	U
8001-35-2	Toxaphene	399.67	U
12674-11-2	PCB-1016	95.92	U
1104-28-2	PCB-1221	191.84	U
11141-16-5	PCB-1232	95.92	U
53469-21-9	PCB-1242	95.92	U
12672-29-6	PCB-1248	95.92	U
11097-69-1	PCB-1254	95.92	U
11096-82-5	PCB 1260	95.92	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/23/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/08/93

WLCooper
WAYNE L. COOPER
LABORATORY DIRECTOR

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ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B2-8.10
LAB ID: 93081288

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	3.13 μg/kg	U μg/kg
319-85-7	β-BHC	4.69	U
319-86-8	δ-BHC	7.04	U
58-89-9	γ-BHC (Lindane)	3.13	U
76-44-8	Heptachlor	2.35	U
309-00-2	Aldrin	3.13	U
1024-57-3	Heptachlor epoxide	3.91	U
959-98-8	Endosulfan I	10.95	U
60-57-1	Dieldrin	3.13	U
72-55-9	4,4'-DDE	3.13	U
72-20-8	Endrin	4.69	U
33213-65-9	Endosulfan II	3.13	U
72-54-8	4,4'-DDD	8.60	U
1031-07-8	Endosulfan Sulfate	51.61	U
50-29-3	4,4'-DDT	9.38	U
72-43-5	Methoxychlor	137.63	U
7421-93-4	Endrin aldehyde	17.99	U
12789-03-6	Chlordane	78.20	U
8001-35-2	Toxaphene	391.00	U
12674-11-2	PCB-1016	93.84	U
1104-28-2	PCB-1221	187.68	U
11141-16-5	PCB-1232	93.84	U
53469-21-9	PCB-1242	93.84	U
12672-29-6	PCB-1248	93.84	U
11097-69-1	PCB-1254	93.84	U
11096-82-5	PCB 1260	93.84	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/23/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/08/93

WAYNE L. COOPER
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ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B3-3.5
LAB ID: 93081289

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	1.62 µg/kg	U µg/kg
319-85-7	β-BHC	2.43	U
319-86-8	δ-BHC	3.65	U
58-89-9	γ-BHC (Lindane)	1.62	U
76-44-8	Heptachlor	1.22	U
309-00-2	Aldrin	1.62	U
1024-57-3	Heptachlor epoxide	2.03	U
959-98-8	Endosulfan I	5.68	U
60-57-1	Dieldrin	1.62	U
72-55-9	4,4'-DDE	1.62	U
72-20-8	Endrin	2.43	U
33213-65-9	Endosulfan II	1.62	U
72-54-8	4,4'-DDD	4.46	U
1031-07-8	Endosulfan Sulfate	26.77	U
50-29-3	4,4'-DDT	4.87	U
72-43-5	Methoxychlor	71.40	U
7421-93-4	Endrin aldehyde	9.33	U
12789-03-6	Chlordane	40.57	U
8001-35-2	Toxaphene	202.83	U
12674-11-2	PCB-1016	48.68	U
1104-28-2	PCB-1221	97.36	U
11141-16-5	PCB-1232	48.68	U
53469-21-9	PCB-1242	48.68	U
12672-29-6	PCB-1248	48.68	U
11097-69-1	PCB-1254	48.68	U
11096-82-5	PCB 1260	48.68	U

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SEPTEMBER 15, 1993

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WAYNE L. COOPER
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ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B4-6.8
LAB ID: 93081290

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	1.58 µg/kg	U µg/kg
319-85-7	β-BHC	2.38	U
319-86-8	δ-BHC	3.56	U
58-89-9	γ-BHC (Lindane)	1.58	U
76-44-8	Heptachlor	1.19	U
309-00-2	Aldrin	1.58	U
1024-57-3	Heptachlor epoxide	1.98	U
959-98-8	Endosulfan I	5.54	U
60-57-1	Dieldrin	1.58	U
72-55-9	4,4'-DDE	1.58	U
72-20-8	Endrin	2.38	U
33213-65-9	Endosulfan II	1.58	U
72-54-8	4,4'-DDD	4.36	U
1031-07-8	Endosulfan Sulfate	26.14	U
50-29-3	4,4'-DDT	4.75	U
72-43-5	Methoxychlor	69.70	U
7421-93-4	Endrin aldehyde	15.84	U
12789-03-6	Chlordane	39.60	U
8001-35-2	Toxaphene	198.00	U
12674-11-2	PCB-1016	47.52	U
1104-28-2	PCB-1221	95.04	U
11141-16-5	PCB-1232	47.52	U
53469-21-9	PCB-1242	47.52	U
12672-29-6	PCB-1248	47.52	U
11097-69-1	PCB-1254	47.52	U
11096-82-5	PCB 1260	47.52	U

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/08/93

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

99

E VIRO _ _ETR CS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B5-1.4
LAB ID: 93081291

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	15.16 μg/kg	U μg/kg
319-85-7	β-BHC	22.74	U
319-86-8	δ-BHC	34.11	U
58-89-9	γ-BHC (Lindane)	15.16	U
76-44-8	Heptachlor	11.37	U
309-00-2	Aldrin	15.16	U
1024-57-3	Heptachlor epoxide	18.95	U
959-98-8	Endosulfan I	53.06	U
60-57-1	Dieldrin	15.16	U
72-55-9	4,4'-DDE	15.16	U
72-20-8	Endrin	22.74	U
33213-65-9	Endosulfan II	15.16	U
72-54-8	4,4'-DDD	41.69	U
1031-07-8	Endosulfan Sulfate	250.14	U
50-29-3	4,4'-DDT	45.48	U
72-43-5	Methoxychlor	667.04	U
7421-93-4	Endrin aldehyde	87.17	U
12789-03-6	Chlordane	379.00	U
8001-35-2	Toxaphene	1,895.00	U
12674-11-2	PCB-1016	454.80	U
1104-28-2	PCB-1221	909.60	U
11141-16-5	PCB-1232	454.80	U
53469-21-9	PCB-1242	454.80	U
12672-29-6	PCB-1248	454.80	U
11097-69-1	PCB-1254	454.80	U
11096-82-5	PCB 1260	454.80	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
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DATE ANALYZED : 9/09/93

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

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GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B6-3.5
LAB ID: 93081292

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	15.32 μg/kg	U μg/kg
319-85-7	β-BHC	22.98	U
319-86-8	δ-BHC	34.47	U
58-89-9	γ-BHC (Lindane)	15.32	U
76-44-8	Heptachlor	11.49	U
309-00-2	Aldrin	15.32	U
1024-57-3	Heptachlor epoxide	19.15	U
959-98-8	Endosulfan I	53.62	U
60-57-1	Dieldrin	15.32	U
72-55-9	4,4'-DDE	15.32	U
72-20-8	Endrin	22.98	U
33213-65-9	Endosulfan II	15.32	U
72-54-8	4,4'-DDD	42.13	U
1031-07-8	Endosulfan Sulfate	252.78	U
50-29-3	4,4'-DDT	45.96	U
72-43-5	Methoxychlor	674.08	U
7421-93-4	Endrin aldehyde	88.09	U
12789-03-6	Chlordane	383.00	U
8001-35-2	Toxaphene	1,915.00	U
12674-11-2	PCB-1016	459.60	U
1104-28-2	PCB-1221	919.20	U
11141-16-5	PCB-1232	459.60	U
53469-21-9	PCB-1242	459.60	U
12672-29-6	PCB-1248	459.60	U
11097-69-1	PCB-1254	459.60	U
11096-82-5	PCB 1260	459.60	U

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SEPTEMBER 15, 1993

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DATE ANALYZED : 9/09/93

WAYNE L. COOPER
LABORATORY DIRECTOR

101

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

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2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B7-6.8
LAB ID: 93081293

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	1.60 μg/kg	U μg/kg
319-85-7	β-BHC	2.41	U
319-86-8	δ-BHC	3.61	U
58-89-9	γ-BHC (Lindane)	1.60	U
76-44-8	Heptachlor	1.20	U
309-00-2	Aldrin	1.60	U
1024-57-3	Heptachlor epoxide	2.01	U
959-98-8	Endosulfan I	5.61	U
60-57-1	Dieldrin	1.60	U
72-55-9	4,4'-DDE	1.60	U
72-20-8	Endrin	2.41	U
33213-65-9	Endosulfan II	1.60	U
72-54-8	4,4'-DDD	4.41	U
1031-07-8	Endosulfan Sulfate	26.47	U
50-29-3	4,4'-DDT	4.81	U
72-43-5	Methoxychlor	70.58	U
7421-93-4	Endrin aldehyde	9.22	U
12789-03-6	Chlordane	40.10	U
8001-35-2	Toxaphene	200.50	U
12674-11-2	PCB-1016	48.12	U
1104-28-2	PCB-1221	96.24	U
11141-16-5	PCB-1232	48.12	U
53469-21-9	PCB-1242	48.12	U
12672-29-6	PCB-1248	48.12	U
11097-69-1	PCB-1254	48.12	U
11096-82-5	PCB 1260	48.12	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
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DATE ANALYZED : 9/08/93

WLCooper
WAYNE L. COOPER
LABORATORY DIRECTOR

102

E VIRO METR CS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B10-1.3
LAB ID: 93081294

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	7.76 µg/kg	U µg/kg
319-85-7	β-BHC	11.64	U
319-86-8	δ-BHC	17.46	U
58-89-9	γ-BHC (Lindane)	7.76	U
76-44-8	Heptachlor	5.82	U
309-00-2	Aldrin	7.76	U
1024-57-3	Heptachlor epoxide	9.70	U
959-98-8	Endosulfan I	27.16	U
60-57-1	Dieldrin	7.76	U
72-55-9	4,4'-DDE	7.76	U
72-20-8	Endrin	11.64	U
33213-65-9	Endosulfan II	7.76	U
72-54-8	4,4'-DDD	21.34	U
1031-07-8	Endosulfan Sulfate	128.04	U
50-29-3	4,4'-DDT	23.28	U
72-43-5	Methoxychlor	341.44	U
7421-93-4	Endrin aldehyde	44.62	U
12789-03-6	Chlordane	194.00	U
8001-35-2	Toxaphene	970.00	U
12674-11-2	PCB-1016	232.80	U
1104-28-2	PCB-1221	465.60	U
11141-16-5	PCB-1232	232.80	U
53469-21-9	PCB-1242	232.80	U
12672-29-6	PCB-1248	232.80	U
11097-69-1	PCB-1254	232.80	U
11096-82-5	PCB 1260	232.80	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
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DATE ANALYZED : 9/09/93

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

103

ENVIRONMETRICS
15 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

COMPANY [illegible] CONTACT [illegible] PROJECT NO. [illegible] Page 1 of 1
ADDRESS 2258 [illegible] Dr. DATE 8-25-93 P.O. NO. 6575
CITY/STATE/ZIP St. Louis MO 63146 DUE DATE 9-6-93
PHONE (314) 997-7440 FAX ( )

SPECIAL INSTRUCTIONS: [illegible]

ITEM	LAB NO.	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	BNA (PP)	Total Metals (PP)	Pest/PCB (PP)	Total CN (PP)	Phenols (PP)	Dioxin (PP)	VOA (PP)				COMMENTS
1	93081287	2498-B1-3.7	8-23-93	—	2oz 1 GAL	X	X	X	X	X	X	X				
2	93081288	2498-B2-8.10	8-23-93	—	"	X	X	X	X	X	X	X				* all analysis to be run PP.
3	93081289	2498-B3-3.5	8-24-93	—	"	X	X	X	X	X	X	X				
4	93081290	2498-B4-6.8	8-24-93	—	"	X	X	X	X	X	X	X				* PP Total (13)
5	93081291	2498-B5-1.4	8-24-93	—	"	X	X	X	X	X	X	X				
6	93081292	2498-B6-3.5	"	—	"	X	X	X	X	X	X	X				
7	93081293	2498-B7-6.8	"	—	"	X	X	X	X	X	X	X				
8	93081294	2498-B10-1.3	"	—	"	X	X	X	X	X	X	X				
9	93081295	2498-B8-1.3	"	—	"	X	X	X	X	X	X	X				Fax ASAP
10	93081296	2498-B9-7.9	"	—		X	X	X	X	X	X	X				
11																
12																
13																
14																
15																
16																

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER
				[signature]	8/25	4:15	[illegible]
	[signature]	8/27	12:05	C J Dotson	8-26	12:05	[illegible]
	C J Dotson	8-31	9:34	[signature]	8-31	9:34	Return
1-10	[signature]	[illegible]	9:33	[signature]	8-31	9:33	[illegible]
	[signature]	9/2	10:25	[signature]	9/1/93	10:55	

DISTRIBUTION: WHITE - Sample Custodian YELLOW - Records PINK - Project Manager GOLD - Field Copy

Revised 11/92

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GEOTECHNOLOGY, INC.
ENGINEERING AND ENVIRONMENTAL SERVICES
ST. LOUIS • KANSAS CITY • CHICAGO

CHAIN OF CUSTODY RECORD

COC Record # 1361 P.O. # ~~6565~~ 6575

Project No. 2498.01.3120.01 Project Name Hubert Wheeler State School

Shipper Name: Geotechnology, Inc.

Address: 2258 Grissom Drive, St. Louis, MO. 63146

Samplers Signature: Sam Brenneke Telephone # (314) 997-7440

Contact: Sam Brenneke Telephone # (314) 997-7440

Collectors Sample #	Date	Sample Type	No. of Containers	Analysis	Remarks
2498-B1-3,7	8/23/93	Soil	2	Priority Pollutant (metals, Volatiles, Semi-Volatiles, Pesticides & PCB's, Cyanides, Phenols)	Normal T.A.
2498-B2-8,10	8/23/93	Soil	2	" " "	"
2498-B3-3,5	8/24/93	Soil	2	" " "	"
2498-B4-6,8	8/24/93	Soil	2	" " "	"
2498-B5-1,4	8/24/93	Soil	2	" " "	"
2498-B6-3,5	8/24/93	Soil	2	" " "	"
2498-B7-6,8	8/24/93	Soil	2	" " "	"
2498-B10-1,3	8/24/93	Soil	2	" " "	"
2498-B8-1,3	8/24/93	Soil	3	Priority Pollutant (metals, Volatiles, Semi-Volatiles, Pesticides, PCB's, Cyanides, Phenols), Dioxin	"
2498-B9-7,9	8/24/93	Soil	3	Priority Pollutant (metals, Volatiles, Semi-volatiles, Pesticides & PCB's, Cyanides, Phenols), Dioxin	"

Receiver Name: 1. Environmetrics

2. ______

(Company Name & Address)

Chain of Possession:

From: Sam Brenneke 8/25/93 To: [signature] 8-25-93 3:48

(Name & Date/Time) (Name & Date/Time)

From: ______ To: ______

105

White copy to Laboratory • Yellow copy to File • Pink copy to Job File

E V RO M TK CS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

GEOTECHNOLOGY, INC.
2258 GRISSOM DRIVE
ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B8-1.3
LAB ID: 93081295

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	15.60 μg/kg	U μg/kg
319-85-7	β-BHC	23.40	U
319-86-8	δ-BHC	35.10	U
58-89-9	γ-BHC (Lindane)	15.60	U
76-44-8	Heptachlor	11.70	U
309-00-2	Aldrin	15.60	U
1024-57-3	Heptachlor epoxide	19.50	U
959-98-8	Endosulfan I	54.60	U
60-57-1	Dieldrin	15.60	U
72-55-9	4,4'-DDE	15.60	U
72-20-8	Endrin	23.40	U
33213-65-9	Endosulfan II	15.60	U
72-54-8	4,4'-DDD	42.90	U
1031-07-8	Endosulfan Sulfate	257.40	U
50-29-3	4,4'-DDT	46.80	U
72-43-5	Methoxychlor	686.40	U
7421-93-4	Endrin aldehyde	89.70	U
12789-03-6	Chlordane	390.00	U
8001-35-2	Toxaphene	1,950.00	U
12674-11-2	PCB-1016	468.00	U
1104-28-2	PCB-1221	936.00	U
11141-16-5	PCB-1232	468.00	U
53469-21-9	PCB-1242	468.00	U
12672-29-6	PCB-1248	468.00	U
11097-69-1	PCB-1254	468.00	U
11096-82-5	PCB 1260	468.00	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
DATE RECEIVED : 8/25/93
DATE ANALYZED : 9/09/93

WLCooper
WAYNE L. COOPER
LABORATORY DIRECTOR

106

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(314) 427-0550

GEOTECHNOLOGY, INC.
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ST. LOUIS, MO 63146

ATTN: SAM BRENNEKE

INVOICE # 22943
PO # 6575
PROJECT # 2498.01.3120.01
HUBERT WHEELER STATE SCHOOL

PESTICIDES & PCB ANALYSIS

METHOD SW-846 8080

SAMPLE ID: 2498-B9-7.9
LAB ID: 93081296

CAS#	PARAMETER	PRACTICAL QUANTITATION LIMIT	RESULTS
319-84-6	α-BHC	7.89 μg/kg	U μg/kg
319-85-7	β-BHC	11.83	U
319-86-8	δ-BHC	17.75	U
58-89-9	γ-BHC (Lindane)	7.89	U
76-44-8	Heptachlor	5.92	U
309-00-2	Aldrin	7.89	U
1024-57-3	Heptachlor epoxide	9.86	U
959-98-8	Endosulfan I	27.60	U
60-57-1	Dieldrin	7.89	U
72-55-9	4,4'-DDE	7.89	U
72-20-8	Endrin	11.83	U
33213-65-9	Endosulfan II	7.89	U
72-54-8	4,4'-DDD	21.69	U
1031-07-8	Endosulfan Sulfate	130.13	U
50-29-3	4,4'-DDT	23.66	U
72-43-5	Methoxychlor	347.01	U
7421-93-4	Endrin aldehyde	45.35	U
12789-03-6	Chlordane	197.17	U
8001-35-2	Toxaphene	985.83	U
12674-11-2	PCB-1016	236.60	U
1104-28-2	PCB-1221	473.20	U
11141-16-5	PCB-1232	236.60	U
53469-21-9	PCB-1242	236.60	U
12672-29-6	PCB-1248	236.60	U
11097-69-1	PCB-1254	236.60	U
11096-82-5	PCB 1260	236.60	U

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SEPTEMBER 15, 1993

DATE COLLECTED : 8/24/93
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DATE ANALYZED : 9/09/93

WLCooper

WAYNE L. COOPER
LABORATORY DIRECTOR

MET ICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

CUSTODY TRAN ER RECORD/LABORATORY WORK REQUE

COMPANY ______ CONTACT ______ PROJECT NO. ______ Page ____ of ____

ADDRESS ______ DATE ______ P.O. NO. ______

CITY/STATE/ZIP ______ DATE DUE ______

SPECIAL INSTRUCTIONS: ______

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER
1-10	[illegible]	9-3	2:42	[illegible]	9-3	2:42	complete
	[illegible]	9/7/[illegible]	9:44	[illegible]	9-7	9:44	

DISTRIBUTION: WHITE - Sample Custodian PINK - Project Manager YELLOW - Records GOLD - Field Copy

APPENDIX D

RISK-BASED ACTION LEVEL CALCULATIONS

RISK BASED ACTION LEVEL CALCULATIONS - SYSTEMIC TOXICANTS

C_m = [Rfd x W]/[I x A]

Where:

C_m = action level in medium (units are medium-dependent)
Rfd = reference dose (mg/kg/day)
W = body weight in kg (16 kg child)
I = intake assumption soil (.2 grams for child)
A = absorption factor (unitless)

From EPA IRIS System: Fluoranthene
Established Reference Dose (Rfd) = 0.04 mg/kg/day

C_m = [0.04 mg/kg/day x 16 kg]/[.2 g x .001 kg/g x 1]
= 3,200 mg/kg soil

From EPA IRIS System: Pyrene
Established Reference Dose (Rfd) = 0.02 mg/kg/day

C_m = [0.02 mg/kg/day x 16 kg]/[.2 g x .001 g/kg x 1]
= 1,600 mg/kg soil

Note: The exposure assumptions and calculations used in deriving Action Levels were obtained from proposed Subpart S of 40 CFR 264 as contained in the July 27, 1990 Federal Register.

RISK BASED ACTION LEVEL CALCULATIONS - CARCINOGENIC CONSTITUENTS

C_m = [R x W x LT]/[CSF x I x A x ED]

Where:

C_m = action level in medium (units are medium-dependent)
R = assumed risk level
(10^{-6} for class A & B)
(10^{-5} for class C)
W = body weight (kg)
LT = assumed lifetime (70 year lifetime)
CSF = carcinogenic slope factor $(mg/kg/day)^{-1}$
I = intake assumption (.1 g/day and 2 l/day)
A = absorption factor (unitless)
ED = exposure duration in years (70 years)

From EPA IRIS System: Benzo(a)pyrene
Established Carcinogenic Slope Factor = 7.3 mg/kg/day

C_m = [10^{-6} x 70 kg x 70 yrs]/[7.3$(mg/kg/day)^{-1}$ x 0.1(g/day) x .001 kg/g x 1 x 70 yrs]
= 0.096 mg/kg soil

From EPA Region VII Interim Policy Procedures: Benzo(b)fluoranthene
Calculated Carcinogenic Slope Factor = 0.73 mg/kg/day

C_m = [10^{-6} x 70 kg x 70 yrs]/[0.73$(mg/kg/day)^{-1}$ x 0.1(g/day) x .001 kg/g x 1 x 70 yrs]
= 0.96 mg/kg soil

From EPA Region VII Interim Policy Procedures: Chrysene
Calculated Carcinogenic Slope Factor = 0.073 mg/kg/day

C_m = [10^{-6} x 70 kg x 70 yrs]/[0.073$(mg/kg/day)^{-1}$ x 0.1(g/day) x .001 kg/g x 1 x 70 yrs]
= 9.6 mg/kg soil

Note: The exposure assumptions and calculations used in deriving Action Levels were obtained from proposed Subpart S of 40 CFR 264 as contained in the July 27, 1990 Federal Register.

Region VII EPA has adopted an interim policy which considers Carcinogenic Poly Aromatic Hydrocarbons (PAH's) to have Carcinogenic Equivalency Factors (CEF's) relative to benzo(a)pyrene, the only PAH which has an established carcinogenic slope factor. These CEF's are 0.1 for benzo(b)fluoranthene and 0.01 for chrysene. The current carcinogenic slope factor for benzo(a)pyrene is 7.3 mg/kg/day. To obtain calculated carcinogenic slope factors, one multiplies the carcinogenic slope factor of benzo(a)pyrene times the CEF of the given PAH.

Thus: Calculated Carcinogenic Slope Factor (CSF) for benzo(b)fluoranthene
CSF = 0.1 x 7.3 mg/kg/day = 0.73 mg/kg/day
Calculated Carcinogenic Slope Factor (CSF) for chrysene
CSF = 0.01 x 7.3 mg/kg/day = 0.073 mg/kg/day

APPENDIX E

LIMITATIONS OF REPORT

LIMITATIONS OF REPORT

1. This report has been prepared on behalf of and for the exclusive use of the addressee, solely for use in assessing conditions at the site. This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other part, nor used by any other party in whole or in part, without the prior written consent of Geotechnology. However, Geotechnology acknowledges and agrees that the report may be conveyed to the regulatory agencies as desired or to the lending institutions and prospective buyers associated with the sale of the property.

2. The assessment was performed in general accordance with appropriate state guidelines and generally accepted practices of other consultants undertaking similar assessments at the same time and in the same geographical area, and Geotechnology observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. The findings and conclusions stated herein must be considered not as scientific certainties, but rather as professional opinions concerning the significance of the limited data gathered during the course of the assessment. No other warranty, express or implied, is made. Specifically, Geotechnology does not and cannot represent that the site contains no hazardous waste or material, oil (including petroleum products) or other latent condition beyond that observed by Geotechnology during the assessment.

3. The observations described in the Report were made under the conditions stated therein. The conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedure beyond the scope of described services. The work described in this report was carried out in accordance with the Terms for Geotechnology's Services which accompanied the proposal.

4. In the event that information is developed relative to environmental or hazardous waste or material issues at the site and not contained in this report, such information shall be brought to Geotechnology's attention. Geotechnology will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this Report.

5. The conclusions and recommendations contained in this Report are based in part upon the data obtained from a limited number of soil and/or groundwater samples obtained from widely spaced sampling. The identified presence of contaminated soil is limited to the extent that contaminated soil could be identified by color, smell, instrumentation and sampling and testing. There is a potential for contaminated soil above the indicated concentrations to occur elsewhere on the site. The nature and extent of variations between these explorations may not become evident until further exploration. If variations or other latent conditions then appear evident, and/or if changes are made in regulations, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. Quantitative laboratory testing was performed as part of the site assessment by an outside laboratory, Geotechnology has relied upon the data provided, and has not conducted an independent evaluation of the reliability of these data.

7. Chemical analyses have been performed for specific parameters during the course of this assessment as described in the text. However, it should be noted that additional chemical constituents not searched for during the assessment could be present in soil and/or groundwater at the site.

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51-7022
ra Gerlette, Program Specialist, 751-6904

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Ph. 913 631-3708
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Ph. 314 348-4050
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Kansas City 64137-1937
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St. Louis 63103-2538
Ph. 314 531-5098

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Ph. 314 751-4427, Jefferson City

Dewayne E. Cossey, Superintendent
Total Teachers 209
Total Enrollment 1,56?
Number of Sc...

Bowling Green — Lillian Schaper
Route 3, Box 86 (63334-9608)
Connie Billings — Enrollment 17
Ph. 314 324-3257 — Teachers 2

Cape Girardeau — Parkview
1020 S. Parkway Dr. (63701)
Mari Jo Lynch — Enrollment 33
Ph. 314 290-5799 — Teachers 4

Chillicothe — Verelle Peniston
1530 Clay St. (64601-2098)
David Cott — Enrollment 21
Ph. 816 646-4215 — Teachers 3

Clarkton — No. 10
P.O. Box 187 (63837-9739)
Clarence R. Bennett — Enrollment 34
Ph. 314 448-3773 — Teachers 4

Columbia — Delmar A. Cobble
108 W. Craig (65202-1455)
__________ — Enrollment 50
Ph. 314 442-6482 — Teachers 7

Dexter — No. 27
916 Smith Ave. (63841)
Susan Barwick — Enrollment 9
Ph. 314 624-4669 — Teachers 1

Doniphan — Current River
700 Apricot St. (63935-1104)
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Ph. 314 996-2518 — Teachers 2

Eldon — No. 55
Central School Bldg. (65026)
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Ph. 314 392-5593 — Teachers 1

Flat River — Special Acres
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Ph. 816 436-7747 — Teachers 11

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351 W. Gregory, R.R., Box 179B (64063)
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Ph. 816 373-5656 — Teachers 12

Mapaville — Mapaville
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Monett — Oakview
200 Linden St. (65708)
Catherine McGowan — Enrollment 21
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Ph. 314 686-9592 — Teachers 5

Potosi — Citadel
400 South Mines (63664-1828)
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Ph. 314 438-2472 — Teachers 1

Rolla — B. W. Robinson
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__________ — Enrollment 26
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321 Knaust Rd. (63376)
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	Grades	Schs.	Tchs.	Res.	Day	Total
Lower School	PK-6	1	6	8	14	22
Jr. High	7-9	1	2	5	4	9
H.S.	10-12	1	18	14	20	34
MH/DB		1	10	20	13	33

Donald K. Gerard, Pres., Adv. Bd.
Marilyn Camden, Secy., Adv. Bd.

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Marilyn Camden	Admin. Asst.	28
Thomas Culliton	Dir., Stu. Affairs	25
______________	Supvr. Res. Serv.	—
Darlene Ivy	Asst. Dorm. Dir.	18
Loretta Phillips	Asst. Dorm. Dir.	17
______ ______	Prin., Lower/Upper Sch.	—
Karer [illegible]	Teacher-In-Chg., MH/DB	20
Brenc [illegible]r	Prin., MH/DB	13

Linda VanEck-Niedringhaus	Dir., Outreach Serv.	9
Donna Hecke	Dir., Clinical & Ancillary Serv.	25
Sandra Argabright	LI/Media Supvr.	3
William J. Hennessey	Soc. Worker	13
Elaine Bidstrup	Guidance Coun.	3
Kenneth Holbert	Bus., Mgr.	3
______________	Teacher-in-Chg., L/U	--

MISSOURI SCHOOL FOR THE DEAF (014-400)

(Fulton 65251-1799)
Ph. 314 592-4000

	Grades	Schs.	Tchs.	Res.	Day	Total
Prim./ Elem.	K-5	1	12	34	20	54
Jr. H.S.	6-8	1	8	36	6	42
H.S. & Voc.	9-12	1	21	63	12	75

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Clanahan ... Secy. to Supt. 04

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741-6223
W Mays ... Prin. 10

20 Grove Spring Elem. K-6 (130)
Box 100 Grovespring 65662-9999
462-3288
McCoy ... Prin. 10

3040 Hartville Elem. K-7 (356)
PO Box F Hartville 65667-0606
741-7141
McCoy ... Prin. 10

Mountain Grove R-III
PO Box 806 Mountain Grove
6
926-31[illegible] FAX: (417) 926-3054
: $24[illegible]3,987 Tax Levy: $2.120
A

	Sch.	Cert. Staff	Res.	Non.-Res.	Total
	1	48	705	0	705
	1	33	571	0	571
	2	47	462	32	494
	4	128	1,738	32	1,770

Heiss ... Pres. of Bd.
ta F McIntosh ... Secy. of Bd.
awson ... Supt. 07
cIntosh ... Secy. to Supt. 36
tin ... Admin. Asst. 10
ll ... Admin. Asst. 19

5 Juvenile Detention Ctr. 9-12 (2)
t PO Box 806 Mountain Grove
6
926-3177
: Benson ... Dir. 24

0 Mountain Grove High 9-12 (492)
n PO B[illegible]806 Mountain Grove
6
926-3116
: Benson ... Prin. 24

Mtn. Grove Area Voc.-Tech. 9-12
St PO Box 806 Mountain Grove
6
926-3119
t R Mitchell ... Dir. 18

Mountain Grove Middle Sch. 5-8 (571)
65711-0806
Ph.: (417) 926-4165
Mr. Troy M Wood ... Prin. 02

114-115 Mansfield R-IV
Madison and Ohio PO Box 418 Mansfield
65704-0418
Ph.: (417) 924-8458 FAX: (417) 924-3427
Asses. Val.: $15,153,776 Tax Levy: $2.340
Class.: AA MSIP: Provisional

	Sch.	Cert. Staff	Res.	Non.-Res.	Total
Elem	1	26	407	0	407
Jr. H.S	1	5	128	0	128
H.S	1	15	234	0	234
Total	3	46	769	0	769

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Mr. John Williams ... Secy. of Bd.
Robert Perry ... Supt. 16
Debbie Letsinger ... Secy. to Supt. 16
Dorothy Wallace ... Specl. Ed. Dir. 19

1050 Mansfield High 9-12 (234)
300 W Ohio Ave PO Box 107 Mansfield
65704-0107
Ph.: (417) 924-3236 FAX: (417) 924-8789
Mr. Jerry Armstrong ... Prin. 07

2050 Mansfield Jr. High 7-8 (128)
300 W Ohio Ave PO Box 419 Mansfield
65704-0419
Ph.: (417) 924-8625
Mr. Freddie R Doherty ... Prin. 04

4020 Wilder Elem. K-6 (407)
300 W Ohio Ave PO Box 379 Mansfield
65704-0379
Ph.: (417) 924-3289
Ms. Jean C Coday ... Prin. 25

114-116 (E) Manes R-V
PO Box 160A Mountain Grove 65711-0160
Ph.: (417) 668-5313
Asses. Val.: $2,377,205 Tax Levy: $2.090
Class.: U

	Sch.	Cert. Staff	Res.	Non.-Res.	Total
Elem	1	11	76	0	76
Jr. H.S	0	0	0	0	0
H.S	0	0	0	0	0
Total	1	11	76	0	76

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Mr. Kenneth D Wade ... Secy. of Bd.
Rauna Benson ... Prin. 20
Ruth Wade ... Secy. to Prin. 21

115-115 St. Louis City
911 Locust St St. Louis 63101-1471
Ph.: (314) 231-3720 FAX: (314) 231-3017
Asses. Val.: $2,147,483,647 Tax Levy: $4.310
Class.: AAA

	Sch.	Cert. Staff	Res.	Non.-Res.	Total
Elem	74	1,967	22,553	4	22,557
Jr. H.S	19	668	7,210	3	7,213
H.S	10	701	8,756	14	8,770
Total	103	3,336	38,519	21	38,540

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3836 Natural Bridge St. Louis 63107-2099
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Mr. Charles J Brasfield ... Prin. 41

1380 Continued Education Project 5-12 (135)
814 N 19th St St. Louis 63108-3511
Ph.: (314) 231-7316 FAX: (314) 436-8924
Mr. Cozy Marks ... Prin. 31

1420 Honors Art 9-12 (6)
3616 N Garrison Ave St. Louis 63107-2501
Ph.: (314) 371-1045
Mr. Carl Landis ... Prin. 39

1440 Cleveland NJROTC Academy 9-12 (950)
4352 Louisiana Ave St. Louis 63111-1046
Ph.: (314) 832-0933 FAX: (314) 832-0246
Dr. Richard A Stumpe ... Prin. 42

1560 Metro High 9-12 (202)
5017 Washington Ave St. Louis 63108-1197
Ph.: (314) 367-5210 FAX: (314) 367-7160
Mrs. Betty M Wheeler ... Prin. 30

1680 Roosevelt High 9-12 (1947)
3125 S Kingshwy St. Louis 63139-1187
Ph.: (314) 776-6040 FAX: (314) 776-0152
Mr. Thomas P Daly ... Prin. 28

1730 Soldan International Studies 9-12
918 N Union St. Louis 63108-1089
Ph.: (314) 367-9222
Dr. Harold Greer ... Prin. 34

1800 Sumner High at McKinley 9-12 (1483)
4248 Cottage Ave St. Louis 63113-2694
Ph.: (314) 371-1048 FAX: (314) 531-9852
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1830 Vashon High 9-12 (1008)
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Ph.: (314) 533-9487 FAX: (314) 533-7540
Mr. Ivory Lofton ... Prin. 23

1860 Central Visual/Perf. Arts High 9-12 (780)
3616 N Garrison Ave St. Louis 63107-2598
Ph.: (314) 371-1045 FAX: (314) 371-1047
Mr. Carl C Landis ... Prin. 39

3020 Blewett Middle Sch. 6-8 (352)
1927 Cass Ave St. Louis 63106-3299
Ph.: (314) 231-7738
Mr. Odell Johnson ... Prin. 29

3040 Blow Middle Sch. 6-8 (558)
516 Loughborough Ave St. Louis 63111-2797
Ph.: (314) 353-1349
Mr. Richard Sirna ... Prin. 23

3050 Busch/Academic-Athletic Acad. 6-8 (301)
5910 Clifton Ave St. Louis 63109-3407

. . . . Prin. 31

3070 Carr Lane VPA Middle Sch. 6-8
1004 N Jefferson Ave St. Louis 63106-2299
Ph.: (314) 231-0413
Mrs. Alice Roach . . . . Prin. 22

3110 International Studies 6-8 (268)
4265 Clarence St. Louis 63115-3002
Ph.: (314) 382-7186
Mrs. Doris Johnson . . . . Prin. 27

3130 Enright/Classical Jr. Acad. 6-8 (389)
5351 Enright Ave St. Louis 63112-3210
Ph.: (314) 367-0555
Mrs. Mary B Purdy . . . . Prin. 29

3140 Fanning Middle Sch. 6-8 (509)
3417 Grace Ave St. Louis 63116-4792
Ph.: (314) 772-1038
Mrs. Joann Perkins . . . . Prin. 29

3240 Langston Middle Sch. 6-8 (365)
5511 Wabada Ave St. Louis 63112-4397
Ph.: (314) 383-2908
Mr. Robert A Hudson . . . . Prin. 31

3260 Long Middle Sch. 6-8 (391)
5028 Morganford Rd St. Louis 63116-2311
Ph.: (314) 481-3440
Mr. David A Eaton . . . . Prin. 27

3280 L'Ouverture Middle Sch. 6-8 (474)
3021 Hickory St St. Louis 63104-1899
Ph.: (314) 664-3579
Mr. William M Boyd . . . . Prin. 30

3310 Northwest Middle Sch. 6-8
5140 Riverview Blvd St. Louis 63120-1999
Ph.: (314) 385-4774
Mrs. Terell Wayne . . . . Prin. 09

3320 Mason I.L.C. Middle Magnet 6-8 (264)
6031 Southwest Ave St. Louis 63139-2716
Ph.: (314) 645-1201
Mrs. Doris T Reece . . . . Prin. 38

3360 Nottingham Middle Sch. 6-8 (270)
4915 Donovan Ave St. Louis 63109-2698
Ph.: (314) 352-6085
Mr. Albert L Reinsch . . . . Prin. 35

3370 Pruitt Military Academy 6-8 (423)
1212 N 22nd St St. Louis 63106-2700
Ph.: (314) 231-1443
Mr. Maurice A Grant . . . . Prin. 38

3380 Simmons Middle Sch. 6-8 (363)
4318 St Louis Ave St. Louis 63115-2898
Ph.: (314) 535-5844
Mrs. Barbara Harvey . . . . Prin. 23

3400 Stevens Middle Sch. 6-8 (435)
1033 Whittier St St. Louis 63113-3199
Ph.: (314) 533-8550
Mr. Arthur J Sharpe . . . . Prin. 39

3420 Stowe Middle Sch. 6-8 (264)
5750 Lotus Ave St. Louis 63112-4020

Mr. Jimmie L Billups . . . . P

3440 Turner Middle Sch. and Br. 6-8
2615 Pendleton St. Louis 63113-2532
Ph.: (314) 535-8482
Mr. Clarence W Ward . . . . P

3480 Webster Middle Sch. 6-8 (302)
2127 N 11th St St. Louis 63106-4204
Ph.: (314) 231-9196
Mr. Charles L Shelton . . . . P

3500 Williams Middle Sch. 6-8 (411)
3955 St Ferdinand Ave St. Louis 63113-
Ph.: (314) 652-4545
Mr. Walter R Glenn . . . . P

3520 Yeatman Middle Sch. 6-8 (336)
4265 Athlone Ave St. Louis 63115-3097
Ph.: (314) 261-8132
Mr. James E Strughold . . . . P

4060 Ashland Elem. and Br. K-5 (55
3921 N Newstead Ave St. Louis 63115-27
Ph.: (314) 385-4767
Mrs. Marilyn D Wayne . . . . P

4080 Baden Elem. K-5 (389)
8724 Halls Ferry Rd St. Louis 63147-1905
Ph.: (314) 388-2477
Mr. Jerome S Buterin . . . . Pri

4100 Banneker Elem. K-5 (324)
2840 Lucas Ave St. Louis 63103-1302
Ph.: (314) 533-1872
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4180 Bryan Hill Elem. K-5 (295)
2128 Gano Ave St. Louis 63107-1399
Ph.: (314) 534-0370
Mrs. Sharon M Braun . . . . Pri

4200 Buder Elem. K-5 (565)
5319 Lansdowne Ave St. Louis 63109-2311
Ph.: (314) 352-4343
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4250 Ames Visual/Perf. Arts K-5 (280)
2900 Hadley St. Louis 63107-3911
Ph.: (314) 241-7165
Mr. David L Bird . . . . Pri

4280 Carver Elem. K-5 (261)
3325 Bell Ave St. Louis 63106-1699
Ph.: (314) 533-7020
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4320 Clark Elem. K-5 (352)
1020 N Union Blvd St. Louis 63113-1516
Ph.: (314) 367-1505
Mr. Robert E Ward . . . . Pri

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3820 N 14th St St. Louis 63107-2928
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Mr. Francis Muehlheausler . . . . Pri

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3935 Enright Ave St. Louis 63108-3559

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5 Horton Pl St. Louis 63112-2107
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. James Overton . . . . Prin. 09

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: (314) 531-8680
s. Yetta B Kilgore . . . . Prin. 39

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3113-1798
: (314) 367-2414
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: (314) 645-4845
r. Ann H Russek . . . . Prin. 30

4480 Dunbar and Br. K-5 (372)
415 N Garrison Ave St. Louis 63106-1506
: (314) 533-2526
r. Cicero L Clark . . . . Prin. 26

4500 Eliot Elem. K-5 (340)
4242 Grove St St. Louis 63107-1821
Ph.: (314) 535-0096
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4510 Early Childhood Center II K-2 (73)
1530 S Grand St. Louis 63104-1304
Ph.: (314) 865-2600
Mrs. Carolyn Bernard . . . . Prin. 28

4520 Emerson Elem. K-5 (243)
5415 Page Blvd St. Louis 63112-3498
Ph.: (314) 367-9030
Mr. William F Busch . . . . Prin. 13

4550 Euclid Montessori Branch II K- K (64)
5057 Ridge Ave St. Louis 63113-1403
Ph.: (314) 367-8816
Mrs. Bessie Mosley . . . . Prin. 27

4560 Euclid Montessori 1-5 (222)
1131 N Euclid Ave St. Louis 63113-2009
Ph.: (314) 367-4385
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4025 Sullivan Ave St. Louis 63107-2098
Ph.: (314) 531-1198
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4466 Olive St St. Louis 63108-1808
Ph.: (314) 533-4935
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4630 Ford and Ford Br. Elem. K-5 (374)

1383 Clara Ave St. Louis 63112-4138
Ph.: (314) 383-0836
Dr. Freddie Stevens . . . .

4660 Froebel Elem. K-5 (335
3709 Nebraska Ave St. Louis 63118-37
Ph.: (314) 776-3580
Mr. William J Hardebeck . . . .

4700 Garfield Elem. K-5 (251
2612 Wyoming St St. Louis 63118-249
Ph.: (314) 776-3713
Dr. Norman D Brust . . . .

4720 Gallaudet Sch. for Deaf Elem.
1616 S Grand Blvd St. Louis 63104-13
Ph.: (314) 771-2894
Mrs. Dyanne P Anthony . . . .

4760 Gundlach Elem. K-5 (33
2931 Arlington Ave St. Louis 63120-21
Ph.: (314) 383-0913
Mr. Gerald O Declue . . . .

4780 Hamilton Elem. K-5 (23
5819 Westminster Pl St. Louis 63112-1
Ph.: (314) 367-0552
Mr. John L Bernard . . . .

4820 Harrison Elem. K-5 (27
4163 Green Lea Pl St. Louis 63115-30
Ph.: (314) 531-8030
Mrs. Vernice Hicks . . . .

4840 Hempstead Elem. K-5 (3
5872 Minerva Ave St. Louis 63112-379
Ph.: (314) 385-2011
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4880 Henry Elem. K-5 (491)
1220 N Tenth St St. Louis 63106-4636
Ph.: (314) 231-7284
Mr. Marion J Knox . . . .

4890 Hickey Elem. K-5 (335
3111 Cora Ave St. Louis 63115-2399
Ph.: (314) 383-2550
Mr. Lincoln Daniels . . . .

4900 Herzog Elem. K-5 (308
5831 Pamplin Pl St. Louis 63147-1099
Ph.: (314) 385-2212
Mr. Edmond R Squires . . . .

4920 Hodgen Elem. K-5 (429
2748 Henrietta St St. Louis 63104-209
Ph.: (314) 771-2539
Mrs. Wanda G Reese . . . .

5000 Jackson Elem. K-5 (23
1632 Hogan St St. Louis 63106-3005
Ph.: (314) 231-8464
Mrs. Mary A Polk . . . .

5020 Jefferson Elem. K-5 (42
1301 Hogan St St. Louis 63106-4732
Ph.: (314) 231-2459
Mrs. Muriel M Hicks . . . .

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5031 Potomac St St. Louis 63139-1316
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5060 Laclede Elem. K-5 (422)

5821 Kennerly Ave St. Louis 63112-3897
Ph.: (314) 385-0546
Mrs. Joyce E Roberts .... Prin. 23

5080 Lafayette Elem. K-5 (446)

815 Ann Ave St. Louis 63104-4134
Ph.: (314) 771-8666
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5100 Lexington Elem. K-5 (298)

5030 Lexington Ave St. Louis 63115-1594
Ph.: (314) 385-2522
Mr. David Learman .... Prin. 17

5160 Lowell Elem. K-5 (281)

1409 Linton Ave St. Louis 63107-1197
Ph.: (314) 534-5050
Mr. Lavaunt Maupin .... Prin. 27

5180 Lyon Academy - Basic Instr. K-5 (205)

417 Vermont Ave St. Louis 63111-3037
Ph.: (314) 353-1353
Mr. Richard A Mirkay .... Prin. 24

5240 Mallinckrodt A.B.I. Elem. K-5 (270)

6020 Pernod Ave St. Louis 63139-1909
Ph.: (314) 352-9212
Mr. Emanuel W Buren .... Prin. 39

5260 Mann Elem. K-5 (341)

4047 Juniata St St. Louis 63116-3913
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5280 Mark Twain Elem. K-5 (347)

5316 Ruskin Ave St. Louis 63115-1397
Ph.: (314) 381-1616
Mrs. Lorraine W Merchant .... Prin. 24

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4342 Aldine Ave St. Louis 63113-2796
Ph.: (314) 371-1642
Mr. Jimmie Mahan .... Prin. 28

5500 Meramec Elem. K-5 (361)

45 Meramec St St. Louis 63118-4597
Ph.: (314) 353-7145
Mrs. Beverly W Wilkins .... Prin. 25

5520 Elias Michael Elem. U- K (59)

4568 Forest Park Blvd St. Louis 63108-2186
Ph.: (314) 361-1511
Mrs. Margaret B Houlihan .... Prin. 37

5540 Mitchell Elem. K-5 (296)

955 Arcade Ave St. Louis 63112-2799
Ph.: (314) 367-0930
Mr. Donald W Smith .... Prin. 32

5590 Mullanphy Botanical Gardens K-5

4221 Shaw Ave St. Louis 63110-3526
Ph.: (314) 361-3401
Mrs. Marian E Cotter .... Prin. 36

5600 Oak Hill Elem. K-5 (578)

4300 Morganford Rd St. Louis 63116-150
Ph.: (314) 481-0420
Mr. Anthony R Bassett ....

5620 Peabody Elem. K-5 (357)

1224 S 14th St St. Louis 63104-3004
Ph.: (314) 241-1533
Mr. Luther C Pollard ....

5720 Roe Elem. K-5 (409)

1921 Prather Ave St. Louis 63139-3552
Ph.: (314) 645-1207
Mr. Michael Lewis ....

5740 Scruggs Elem. K-5 (518)

4611 S Grand Blvd St. Louis 63111-1424
Ph.: (314) 752-0604
Mrs. Gloria Casey ....

5760 Scullin Elem. K-5 (296)

4160 N Kingshwy Blvd St. Louis 63115-17
Ph.: (314) 383-4200
Mr. Thomas Echols ....

5780 Shaw Visual/Perf. Arts Ctr. K-5

5329 Columbia Ave St. Louis 63139-1443
Ph.: (314) 776-5091
Mr. Robert Lewis ....

5800 Shenandoah Elem. K-5 (182)

3412 Shenandoah Ave St. Louis 63104-17
Ph.: (314) 772-7544
Mr. Paul R Kuhn ....

5820 Shepard Elem. K-5 (463)

3450 Wisconsin Ave St. Louis 63118-3247
Ph.: (314) 776-3664
Dr. Savannah M Young ....

5840 Sherman Elem. K-5 (295)

3942 Flad Ave St. Louis 63110-4034
Ph.: (314) 776-2626
Mrs. Juanita T Doggett ....

5860 Sigel Elem. K-5 (278)

2050 Allen Ave St. Louis 63104-2629
Ph.: (314) 771-0010
Mr. Michael Miley ....

5960 Walbridge Elem. K-5 (451)

5000 Davison Ave St. Louis 63120-2319
Ph.: (314) 383-1829
Mr. James C Ewing ....

5980 Walnut Park Elem. K-5 (291)

5814 Thekla Ave St. Louis 63120-1998
Ph.: (314) 383-0088
Dr. Donald G Nabors ....

6000 Waring A.B.I. Elem. K-5 (252)

25 S Compton Ave St. Louis 63103-2001
Ph.: (314) 533-4770
Mr. Cleveland Young ....

6010 Washington Montessori K-5 (332)

1130 N Euclid Ave St. Louis 63113-2010
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12 Arsen... St. Louis 63143-3404
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6100 Woerner I.G.E. Elem. K-5 (418)

31 Leona St. Louis 63116-2922
Ph.: (314) 481-8585
Mr. Aaron H Johnson .... Prin. 38

6120 Woodward Elem. K-5 (303)

5 Bellerive Blvd St. Louis 63111-2130
Ph.: (314) 353-1346
Mr. Raymond E Stahl .... Prin. 34

6140 Wyman Elem. K-5 (363)

47 Theresa Ave St. Louis 63104-1317
Ph.: (314) 772-9328
Mr. John R Phillips .... Prin. 23

6280 Cardinal Glennon Hospital U- K (19)

465 S Grand Blvd St. Louis 63104-1095
Ph.: (314) 577-5600
Mrs. Louise Wilkerson .... Dir. 28

6340 St. Louis Children's Hospital U- K (23)

400 S Kingshwy Ave St. Louis 63110-1014
Ph.: (314) 454-6000
Mrs. Louise Wilkerson .... Dir. 28

6470 Annie Malone Children's Home U- K (3)

2612 Annie Malone Dr St. Louis 63113-0000
Ph.: (314) 531-0120
Mrs. Louise Wilkerson .... Exec. Dir. 27

6620 Children's Study School K-8 (9)

3827 Enright Ave St. Louis 63108-3519
Ph.: (314) 533-9348
Mrs. Louise Wilkerson .... Dir. 28

6680 Griscom Detention Ctr. 5-12 (105)

3847 Enright Ave St. Louis 63108-3519
Ph.: (314) 531-3600 FAX: (314) 531-8519
Mr. Cullen Cook .... Prin. 10

6760 Tri-A Outreach 6-12 (60)

1909 N Kingshwy Ave St. Louis 63113-1123
Ph.: (314) 382-5952 FAX: (314) 382-5806
Mr. Floyd Crues .... Prin. 14

8540 Work Study-Attendance Only 9-12

5101 McRee Ave St. Louis 63110-1401
Ph.: (314) 776-2215
Mr. Frank Logan .... Supv. 14

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 9

TELEPHONE OR CONFERENCE RECORD

FILE: St. Louis City General

DATE: February 2, 1993

TELEPHONE
Incoming (X)
Outgoing ( )

CONFERENCE
Field ( )
Office ( )

5707 Wilson St
St Louis, MO

SUBJECT: Hubert Wheeler State School

PERSONS INVOLVED:

NAME	REPRESENTING
Ms. Julie Bloss	MDNR/HWP
Ms. Laurie Bobbitt	MDNR/HWP
Mr. Ed Alizadeh	Geotechnology (314) 997-7440

SUMMARY OF CONVERSATION: Mr. Alizadeh called to discuss the Hubert Wheeler State School for special children. The school was constructed, in part, over a landfill. Black material allegedly oozes through the asphalt during warm months. If you dig down four feet, you can see this material "flowing."

The school contacted Mr. Alizadeh because they are interested in remediating the site. Mr. Alizadeh thought he should speak with the Missouri Department of Natural Resources (MDNR) before making a recommendation. He wanted to know: 1) Can one branch of the state do their own remediation without MDNR concurrence? 2) What kinds of remediation techniques have been used by utilities on coal tar sites? 3) What kinds of cleanup levels are appropriate?

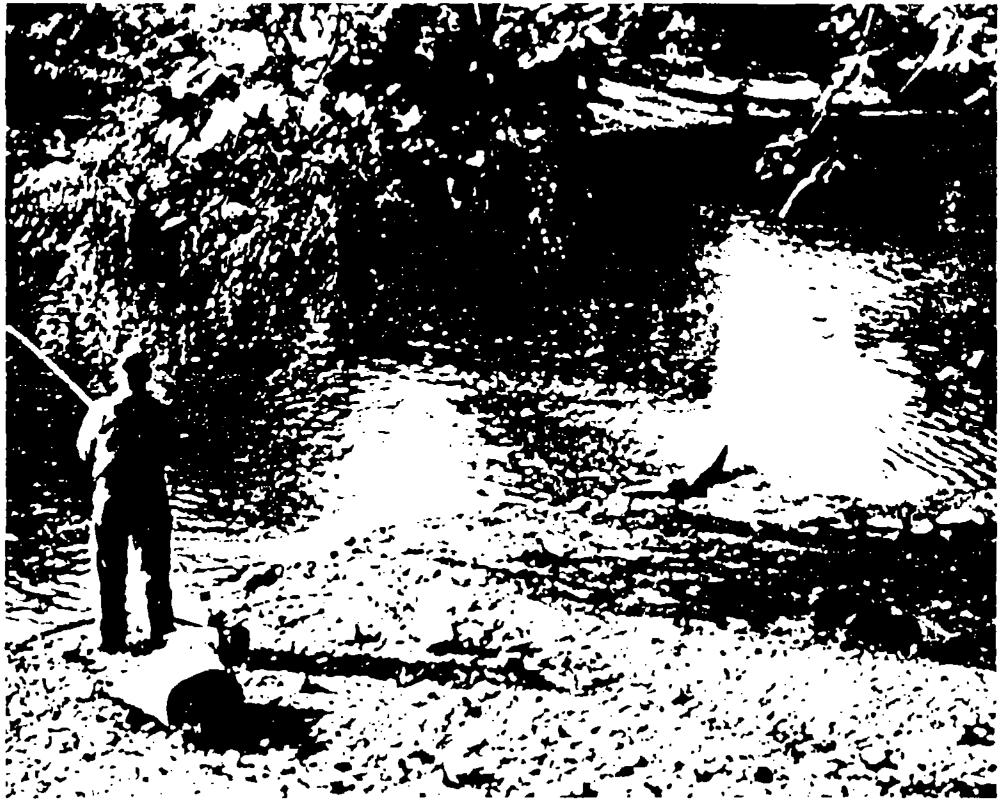
Mr. Alizadeh wants to have his proposal to the school by February 5. I told him that I would try to return his call this week.

ACTION TAKEN: This site was discussed in the Superfund Section staff meeting on February 3, 1993. Mr. Al Wallen agreed to return the call to Mr. Alizadeh.

Julie A. Bloss
Julie A. Bloss
Environmental Specialist
Hazardous Waste Program

JAB:ah

c: Laurie Bobbitt, HWP
Al Wallen, HWP



MISSOURI WATER QUALITY BASIN PLANS

VOLUME 5

Meramec, Whitewater and Castor River, Mississippi River, Joachim, Plattin, Establishment, Cinque Hommes and Apple Creeks.

MISSOURI WATER QUALITY BASIN PLANS

VOLUME 5

Mississippi River and Direct Tributaries from the Missouri to the Ohio River and the Meramec River and Headwater Diversion Channel

TABLE OF CONTENTS

INTRODUCTION

Missouri's Water Quality Basin Plans are a guide to managing the quality of the aquatic resources of the state. In their simplest form they are a set of water quality problems and a corresponding set of actions which will correct these problems.

There are only a few basic kinds of water quality problems such as organic enrichment from domestic and industrial discharges and from livestock, discharges of toxic materials which come from domestic and industrial sources, acid runoff or seepage from coal mined lands, highly mineralized water (a naturally occurring problem in certain groundwaters), and lastly, sediment from erosion of soil or mine tailings

At any given location, the apparent simplicity of our water problems is complicated by such specifics as the volume of the pollutant discharge and its variability, the concentration of specific pollutants and their variability, and the volume of the receiving stream and its variability. The proximity of other pollutant sources or areas of water use (water based recreation areas, drinking water withdrawal points) tends to make a problem in a particular location, if not unique, at least discernably more or less severe than a similar problem in another location. These plans should note which problems are of the highest priority.

In recognizing the need to write management plans for specific problem areas, this document divides the state into eight major drainages (corresponding to the eight volumes of this document). It then divides the eight drainages into 77 basins and presents a specific list of water quality problem areas and recommended solutions for each basin.

The first part of each basin plan is a description of the basin in terms of geography, geology, hydrology, and aquatic use potential This description is followed by a detailed inventory of all known actual or potential sources of water pollutants The final part of the basin plan is a discussion of water quality problems and how they affect our water quality goals for the basin, and the basin plan itself in the form of tables listing specific water quality problems, their sources, and recommended solutions.

Each basin plan consists of the following sections

BASIN NUMBER:

BASIN NAME:

DRAINAGE AREA:

COUNTIES: (Included partially or wholly within the basin)

BASIN DESCRIPTION: Geographic limits of the basin and major streams within the basin.

LAND USE: Percentage of basin in forest pasture or cropland, urban lands, or mined lands

CLASSIFIED STREAMS: Missouri's water quality standards (CSR 1981) recognize three kinds of surface waters

P1 Reservoirs Lakes, Sloughs Backwaters, and other impounded waters.

P Permanently flowing streams

C. Streams which may cease flow during prolonged dry weather but maintain permanent pools which act as refuges for aquatic life and provide drinking water for livestock and wildlife.

HYDROGEOLOGY: A description of the surficial and underlying geologic strata and how they influence water movement within the basin.

GEOLOGIC CROSS SECTION DIAGRAM: This diagram shows the geologic strata from the surface to a depth of at least 500 feet indicates how deeply stream valleys incise these strata, and indicates how much water is discharged by known springs from each of these strata

STREAM FLOW: Stream flow data are taken from USGS records There are several flow statistics or descriptions used in water management. Those included in the stream flow table which may require explanation are:

- Mean flow. The arithmetic average flow. That is, the sum of all flows divided by the number of flow measurements.
- Median flow: The flow which is exceeded exactly 50% of the time.
- 7 day-Q10 flow The lowest average flow for a seven consecutive day period with a recurrence interval of ten years.
- 7 day-Q2 flow The lowest average flow for a seven consecutive day period with a recurrence interval of two years.

STREAM USES (CSR, 1981): Missouri recognizes nine beneficial uses of the state's waters Based on numerous public meetings, user surveys and other studies, each classified stream in the state (Class P1, P, or C), or segment thereof, has a list of uses appropriate to that stream The Mississippi and Missouri Rivers and Shoal Creek (Jasper and Newton Counties) have the most recognized uses (seven), a few streams which are badly polluted, like Turkey Creek (Jasper County), have none

The nine beneficial uses are: (1) Irrigation of croplands; (2) Livestock and wildlife watering (3) Protection of aquatic life and fishing, (4) Coldwater sport fishery (trout fishing); (5) Whole body contact recreation (swimming, water skiing, skin diving); (6) Drinking water supply; (7) Industrial process and cooling water; (8) Commercial fishing; (9) Limited water contact recreation (canoeing, boating).

LAKE USES (CSR, 1981): All classified lakes and reservoirs (P1) are identified and their beneficial uses listed. A list of all lakes and reservoirs (including unclassified ones) greater than 50 acres is given showing location, size, and major use(s).

This section also gives the total number of lakes and reservoirs inventoried by the dam safety program (generally those reservoirs greater than 2 acres in area), the range in size, and the mean and median lake area

BASIN 48

DRAINAGE BASIN

The Mississippi River and central tributaries (except the Meramec R and Headwater Diversion Channel) between the Missouri River and the Ohio River

DRAINAGE AREA

1875 square miles

COUNTIES

St. Louis County and City, Jefferson, St. Francois, Ste. Genevieve, Perry, Bollinger, Cape Girardeau, Scott, Mississippi

BASIN DESCRIPTION

This basin is bound on the east by the State of Illinois, on the south by the southern tributaries to the Mississippi River, on the south and west by the Headwater Diversion, on the west by the Upper St. Francis River Basin, the Big River Basin, and the Lower Meramec River Basin and on the west and north by the east-central tributaries to the Missouri River Basin

LAND USE

This basin is estimated from LUDA maps to be 45% row crop and pasture, 45% forest, and 10% urban. The major urban areas include portions of St. Louis and Cape Girardeau

CLASSIFIED STREAMS (CSR, 1981)

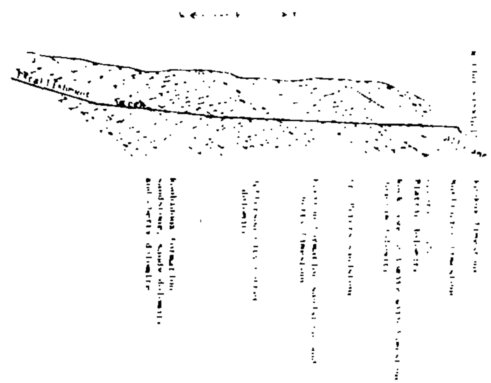
Class "P" (permanent flow) Mississippi River	202.5 miles
Other Class P	311.0 miles
Class "C" (intermittent flow, permanent pools)	183.5 miles
Total	697.0 miles

HYDROGEOLOGY

Aside from very limited areas within eastern St. Louis City and a small area near Ste. Genevieve which have some glacial till deposits, the surface of this basin is bedrock capped with 4 to 12 feet of loess on the uplands. The geology of the area is greatly influenced by the St. Francois uplift to the west. This has caused a considerable downdip of rock strata to the east so that the streams which flow generally west to east incise progressively younger bedrock as they flow downstream. In St. Louis and northern Jefferson County the streams flow through Mississippian limestone but in the remainder of the basin the upper parts of the drainages are in Cambrian dolomites or sandstone and then flow through a series of Ordovician age dolomites and limestones. In Ste. Genevieve County, faulting has thrust up even younger rock along the Mississippi River so that on Saline Creek a 15 mile segment traverses a series of strata representing a span of 250 million years. On River Aux Vases exposures of Precambrian volcanic rock, Cambrian sandstones, Ordovician dolomite and Mississippian limestone span a billion years in a 10-mile segment of stream (Figure 48-1 after Koenig, 1961).

The presence of scattered surface exposures of Gasconade dolomite and Mississippian limestone insures that there will be some infiltration of water to the subsurface. There are 24 springs of note in the basin but only 3 exceed 1.0 cfs. Of these three, one emerges from Mississippian limestone and 2 from Joachim and Dutchtown shaly dolomites and limestone of late Ordovician age (Vineyard 1974). Although most springs are not large, most streams in this basin have moderately well sustained baseflows for their size, particularly those in the southern part of the basin.

Figure 48-1



STREAM USES

All classified streams: Aquatic life protection and fishing, livestock and wildlife watering

Mississippi River (Class P): Drinking water supply, boating, commercial fishing, industrial and irrigation

Apple Creek (Class P): Drinking water supply, whole-body-contact recreation and boating

Saline Creek and River Aux Vases (Class P): Whole-body-contact recreation

Plattin and Joachim Creeks (Class P): Whole-body-contact recreation and industrial

STREAM FLOW

Stations with significant flow records (in cfs):

Location	Period of Record	Max	Min	Mean	Median	Exceeded 80% of time	Exceeded 90% of time	7-day Q10	7-day Q2
Mississippi R at St. Louis	1861-1981	1,019,000	18,000	176,800	140,000	78,000	65,000	46,000	
Mississippi R at Chester	1927-81	886,000	30,000	183,200					
Mississippi R at Thebes	1932-81	893,000	23,400	188,300				47,800	
Gravois Ck. near Kirkwood	1961-64, 67-68 & 71							0	0.2
Joachim Ck at Hematite	1961-65 & 67-71							0.8	3.4
Sandy Ck. near Pevely	1966-72							0	0
Plattin Ck at Plattin	1965-72							0.3	2.6
Establishment Ck at Bloomsdale	1967 & 69-71								6.5
River Aux Vases near Ste Genevieve	1969-71								3.5
Saline Ck near Minnith	1969-71 & 80-81	6,700	3.9	35.8					1.6
Apple Ck at Appleton	1961-64, 67-68 & 71							6.8	10.0
Indian Ck near Fruitland	1967 & 69-71							0	0.1

(U.S. Geological Survey, 1981 and Skelton, 1976)

LAKE USES

Water Quality Standards do not classify any lakes in this basin, however, a number of smaller public and private lakes also qualify as waters of the state, and management will assure that water quality is sufficient to support the uses for which the lakes were constructed. The 93 lakes in this basin over 2 acres have a combined surface area of 2284 acres (924 hectares) Thirteen lakes are larger than 50 acres (20 hectares):

Lake	County	Dam Location	Owner	Use	Surface Acres
Lake Briarwood	Jefferson	SW NE 33.40N.4E	Private	Recreation	103
Lake Wauwanoka	Jefferson	SE NW 1 40N 4E	Lake Wauwanoka, Inc	Recreation	86
Summerset Lake	Jefferson	NE SW 15 39N.4E	Summerset Development	Recreation	75
Parker Lake #2	Perry	NE SW 32 35N 9E	Private	Recreation	80
Perry County Lake	Perry	SW NE 22 35N 10E	Private	Recreation	60
Port Perry Lake	Perry	NE SE 8 34N 9E	Private	Recreation	200
Goose Creek Lake	St Francois	NW NW 26 38N.6E	Private	Recreation	62
Butterfly Lake	Ste Genevieve	NE NW 34 36N 7E	Private	Recreation	85
Lake Forest	Ste Genevieve	36.38N.7E	Private	Recreation	90
Lake Wanda Lee	Ste Genevieve	2 37N.7E	Private	Recreation	220
Sunset Lake	Ste Genevieve	NW SE 33 39N.7E	Private	Recreation	60
(no name)32	Ste Genevieve	SW SE 4 36N 8E	?	Recreation	55
(no name)31	Ste Genevieve	NE NE 9.36N.8E	?	Recreation	55

The mean and median lake surface areas for this basin are 24.56 and 12.0 acres, respectively. The range is 2 to 220 acres

WITHDRAWALS

Cape Girardeau and St Louis make withdrawals from the Mississippi River for public water supply: neither has an impact on other beneficial uses of the river.

POPULATION

Population data are available at the community and township level, but have not been disaggregated by basin. The percent population changes from 1970 to 1980 for the areas comprising most of the basin are as follows: St. Louis City and Co. (12 townships) 1 249.751 to 943.499 (-25%) Jefferson Co (3 townships) 71 096 to 94 670 (- 33%). St Francois Co (1 township) 658 to 1115 (- 69%): Ste Genevieve Co (5 townships) 12.867 to 15.180 (- 18%) Perry Co (8 townships) 14 393 to 16 781 (- 17%). Cape Girardeau Co (3 townships) 4266 to 6320 (- 48%). Scott Co (3 townships) 9846 to 11.020 (- 12%)

WATER QUALITY DATA

"Toxic Materials Impact on the Mississippi R.," 1982. Black & Veatch for MSD. St. Louis, Mo.

Water Quality Data for Mississippi R. near St. Louis. unpublished. Illinois EPA. Springfield. Ill.

Priority Pollutant Analysis. Bissell Point & Lemay Plants. 1980. Sverdrup & Parcel for Metropolitan Sewer District (MSD). St. Louis. Mo.

Water Resources Data for Missouri. 1981 and other annual reports. U S.G.S., Rolla, Mo.

Mississippi River Fish Flesh Analysis. several locations: unpublished MDNR. Jefferson City, Mo

Mississippi River, PCBs Pesticides. unpublished National Fish Pesticide Lab, Columbia, Mo.

Several studies of biological effects of thermal discharges to Mississippi River, 1979. Union Electric Co., St. Louis, Mo.

ENDANGERED SPECIES

These fishes and mussels have been found to require special consideration in this basin:

Naiades (mussels)

- *Anodonta grandis corpulenta* Stout Floater — Threatened
  - Miss. R., Sandy and Plattin Creeks (Jefferson County) It may also occur in natural lakes
- *Arcidens confragosus* Rock Pocketbook — Endangered
- *Cumberlandia monodonta* Spectacle Case — Threatened
  - (River Aux Vases - Ste. Genevieve County)
- *Obovaria olivaria* Hickory-Nut — Endangered
  - Miss. R. at Ste. Genevieve. Perry & Cape Girardeau Counties
- *Quadrula nodulata* Warty-Back — Endangered

Fishes

- *Acipenser fulvescens* Lake Sturgeon — Endangered
- *Alosa alabamae* Alabama Shad — Threatened
  - Migration route
- *Hybopsis meeki* Sicklefin Chub — Threatened
  - Large turbid rivers above the Ohio confluence
- *Hybopsis gelida* Sturgeon Chub — Threatened
  - Large silty plains streams above confluence w Ohio R
- *Lepisosteus spatula* Alligator Gar — Threatened
- *Schaphirhynchus albus* Pallid Sturgeon — Endangered

Other plants and animals which might be impacted by human activities in or near the streams have been identified Consult the referenced agencies and publications for a more complete listing

BASIN INVENTORY INFORMATION

Appropriate inventory information for this basin includes Table 48-1 and Figures 48-2 through 48-6 Table 48-1 lists all known sources of wastewater discharge. their size. character, and location. These sources are mapped in Figures 48-2 and 48-3 Figure 48-4 shows the location of pipelines. losing streams and railroads. Figures 48-5 and 48-6 are stylized diagrams of the stream network at low flow. which shows the location and effects of discharges in the basin.

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B. The period of noncompliance, including exact dates and times and/or the anticipated time when the discharge will return to compliance; and

C. Steps being taken to reduce, eliminate and prevent recurrence of the noncompliance.

5. In the case of any discharge subject to any applicable toxic pollutant effluent standard under Section 307(a) of the Federal Clean Water Act, the information required by paragraph (9)(A)4. regarding a violation of this standard shall be provided within twenty-four (24) hours from the time the owner or operator of the water contaminant source, point source or wastewater treatment facility becomes aware of the violation or potential violation. If this information is provided orally, a written submission covering these points shall be provided within five (5) working days of the time the owner or operator of the water contaminant source, point source or wastewater treatment facility becomes aware of the violation.

(B) Dilution Water. Dilution of treated wastewater with cooling water or other less contaminated water to lower the effluent concentration to limits required by an effluent regulation of the Clean Water Law shall not be an acceptable means of treatment.

(C) Compliance.

1. New sources. Water contaminant sources, point sources and wastewater treatment facilities and their tributary sewer systems on which construction begins after the effective date of the applicable effluent guidelines shall meet all requirements of this regulation and the Missouri Clean Water Law.

2. Sources for which construction and operating permits were issued prior to the effective date of this regulation shall meet all the requirements of the existing permit. Where the existing permit contains more stringent limitations than those contained in this regulation, the permittee may apply to the department for a modification of the permit to contain the new limitations. The department will notify the applicant of its decision to modify or deny the application within sixty (60) days after receiving an application.

(D) Compliance with New Source Performance Standards.

1. Except as provided in paragraph (9)(D)2., any new water contaminant source, point source or wastewater treatment facility on which construction commenced after October 18, 1972, or any new source, which meets the applicable promulgated new source performance standards before the commencement of discharge, shall not be subject to any more stringent new source performance standards or to any more stringent technology-based standards under Subsection 301(b)(2) of the Federal Clean Water Act for the shortest of the following periods:

A. Ten (10) years from the date that construction is completed;

B. Ten (10) years from the date the source begins to discharge process or other nonconstruction related wastewater; or

C. The period of depreciation or amortization of the facility for the purposes of Section 167 or 169 (or both) of the *Internal Revenue Code* of 1954.

2. The protection from more stringent standards of performance afforded by paragraph (9)(D)1. does not apply to—

A. Additional or more stringent permit conditions which are not technology based, for example, conditions based on water quality standards or effluent standards or prohibitions under Section 307(a); and

B. Additional permit conditions controlling pollutants listed as toxic under Section 307(a) of the Federal Clean Water Act or as hazardous substances under Section 311 of the Federal Clean Water Act and which are not controlled by new source performance standards. This exclusion includes permit conditions controlling pollutants other than those identified as hazardous where control of those other pollutants has been specifically identified as the method to control the hazardous pollutant.

(E) Bypassing.

1. Any bypass or shutdown of a wastewater treatment facility and tributary sewer system or any part of such a facility and sewer system that results in a violation of permit limits or conditions is prohibited except—

A. Where unavoidable to prevent loss of life, personal injury or property damages;

B. Where unavoidable excessive storm drainage or runoff would damage any facilities or processes necessary for compliance with the effluent limitations and conditions of this permit; and

C. Where maintenance is necessary to ensure efficient operation and alternative measures have been taken to maintain effluent quality during the period of maintenance.

2. The permittee shall notify the department by telephone within twenty-four (24) hours and follow with a written report within five (5) days of all bypasses or shutdowns that result in a violation of permit limits or conditions. POTWs that bypass during storm water infiltration events need only report on their discharge monitoring reports. This section does not excuse any person from any liability, unless such relief is otherwise provided by the statute.

Auth: section 644.026, RSMo (Cum. Supp. 1990). Original rule filed June 6, 1974, effective June 15, 1974. Amended: Filed April 1, 1975, effective April 11, 1975. Rescinded: Filed Oct. 16, 1979, effective July 11, 1980. Readopted: Filed Feb. 4, 1980, effective July 11, 1980. Rescinded and readopted: Filed Nov. 10, 1982, effective May 12, 1983. Amended: Filed Sept. 11, 1984, effective March 12, 1985. Amended: Filed July 25, 1985, effective Dec. 26, 1985. Amended: Filed Feb. 1, 1988, effective June 13, 1988. Amended: Filed Sept. 13, 1988, effective Feb. 14, 1989. Amended: Filed July 15, 1991, effective Jan. 13, 1992.

10 CSR 20-7.020 Effluent Regulations
(Rescinded July 11, 1980)

10 CSR 20-7.030 Water Quality Standards
(Rescinded December 11, 1977)

10 CSR 20-7.031 Water Quality Standards

PURPOSE: This rule identifies beneficial uses of waters of the state, criteria to protect those uses and defines the antidegradation policy. It is developed in response to the Missouri Clean Water Law and the federal Clean Water Act, Section 303(c)(1) and (2), which requires that state water quality standards be reviewed at least once every three years. These revisions are pursuant to the national goal of protection of fish, shellfish and wildlife and recreation in and on the water as outlined in Section 101(a)(2) of the Act.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the material referenced has been filed with the secretary of state. This material may be found at the Office of the Secretary of State or at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) Definitions.

(A) Acute toxicity—Conditions producing adverse effects or lethality on aquatic life in a short time. The acute criteria in Tables A and B are maximum concentrations which protect against acutely toxic conditions.

(B) Aquifer—A subsurface water-bearing bed or stratum of sand, gravel or bedrock which stores or transmits water in recoverable quantities that is currently being used or could be used as a water source for private or public use. It does not include water in the vadose zone.

(C) Beneficial water uses.

1. Irrigation—Application of water to cropland or directly to plants that may be used for human or livestock consumption. Occasional supplemental irrigation, rather than continuous irrigation, is assumed.

2. Livestock and wildlife watering—Maintenance of conditions to support health in livestock and wildlife.

3. Cold-water fishery—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a naturally reproducing or stocked trout fishery and other naturally reproducing populations of recreationally important fish species.

4. Cool-water fishery—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a sensitive, high-quality sport fishery (including smallmouth bass and rock bass) and other naturally reproducing populations of recreationally important fish species.

5. Protection of aquatic life (General warm-water fishery)—Waters in which naturally occurring water quality and habitat conditions allow the maintenance of a wide variety of warm-water biota, including naturally reproducing populations of recreationally important fish species. This includes all Ozark Class C and P streams, all streams with seven (7)-day Q_{10} low flows of more than one-tenth cubic feet per second (0.1 cfs), all P1 streams and all classified lakes. However, individual Ozark Class C Streams may be determined to be limited warm-water fisheries on the basis of limited habitat, losing-stream classification, land-use characteristics or faunal studies which demonstrate a lack of recreationally important fish species.

6. Protection of aquatic life (Limited warm-water fishery)—Waters in which natural water quality and/or habitat conditions prevent the maintenance of naturally reproducing populations of recreationally important fish species. This includes non-Ozark Class C streams and non-Ozark Class P streams with seven (7)-day Q_{10} low flows equal to or less than 0.1 cfs and Ozark Class C streams with the characteristics outlined in paragraph (1)(C)5.

7. Human health protection (Fish consumption)—Criteria to protect this use are based on the assumption of an average amount of fish consumed on a long-term basis. Protection of this use includes compliance with Federal Drug Administration (FDA) limits for fish tissue, maximum water concentrations corresponding to the 10^{-6} cancer risk level and other human health fish consumption criteria.

8. Whole-body-contact recreation—Activities in which there is direct human contact with the raw surface water to the point of complete body submergence. The raw water may be ingested accidentally and certain sensitive body organs, such as the eyes, ears and the nose, will be exposed to the water. Although the water may be ingested accidentally, it is not intended to be used as a potable supply unless acceptable treatment is applied. Water so designated is intended to be used for swimming, water skiing or skin diving.

9. Boating and canoeing—Activities in which limited contact with water is assumed.

10. Drinking water supply—Maintenance of a raw water supply which will yield potable water after treatment by public water treatment facilities.

11. Industrial process water and industrial cooling water—Water to support various industrial uses; since quality needs will vary by industry, no specific criteria are set in these standards.

12. Wetlands—Wetland uses may include water pollution control, groundwater recharge, erosion control and fish and wildlife protection. The uses and water quality criteria for specific wetlands will vary depending on the type of wetlands.

(D) Chronic toxicity—Conditions producing adverse effects on aquatic life over a long duration but having no effect over a short time period. Chronic numeric criteria in Tables A and B are maximum concentrations which protect against chronic toxicity.

(E) Classified waters—All waters listed as L1, L2 and L3 in Table G and P, P1 and C in Table H. During normal flow periods, some rivers back water into tributaries which are not otherwise classified. These permanent backwater areas are considered to have the same classification as the water body into which the tributary flows.

1. Class L1—Lakes used primarily for public drinking water supply.

2. Class L2—Major reservoirs.

3. Class L3—Other lakes. These include both public and private lakes. For effluent regulation purposes, publicly owned L3 lakes are those for which a substantial portion of the surrounding lands are publicly owned or managed.

4. Class P—Streams that maintain permanent flow even in drought periods.

5. Class P1—Standing-water reaches of Class P streams.

6. Class C—Streams that may cease flow in dry periods but maintain permanent pools which support aquatic life.

(F) Epilimnion—Zone of atmospheric mixing in a thermostratified lake.

(G) Fecal coliform bacteria—A group of bacteria originating in intestines of warm-blooded animals which indicates the possible presence of pathogenic organisms in water.

(H) Geometric mean—A mean obtained by taking an arithmetic average of the logarithms of the individual data points and taking the antilogarithm of that arithmetic average.

(I) Hypolimnion—Zone beneath the zone of atmospheric mixing in a thermostratified lake.

(J) Lethal concentration 50 (LC_{50})—Concentration of a toxicant which would be expected to kill fifty percent (50%) of the individuals of the test species in a test of specified length.

(K) Losing streams—A stream which distributes thirty percent (30%) or more of its flow through natural processes, such as through permeable subsoil and/or cavernous bedrock, into an aquifer. Flow measurements to determine percentage of water loss must be corrected to approximate the seven (7)-day Q_{10} stream flow. If a stream bed or drainage way has an intermittent flow or a flow insufficient to measure in accordance with this rule, it may be determined to be a losing stream on the basis of channel development, valley configuration, vegetation development, dye tracing studies, bedrock characteristics, geographical data and other geological factors. A list of known losing streams is available from the Water Pollution Control Program. Other streams may be determined to be losing by the Division of Geology and Land Survey.

(L) Low-flow conditions—

1. Seven (7)-day one (1)-in-ten (10)-year low flow (7-day Q_{10})—The average minimum flow for seven (7) consecutive days that has a recurrence interval of once-in-ten (10) years.

2. Sixty (60)-day, one (1)-in-two (2)-year low flow (60-day, Q_2)—The average minimum flow for sixty (60) consecutive days that has a recurrence interval of once-in-two (2) years.

(M) Mixing zone—An area of dilution of effluent in the receiving water beyond which chronic toxicity criteria must be met.

(N) Outstanding national resource waters—Waters which have outstanding national recreational and ecological significance. These waters shall receive special protection against any degradation in quality. Congressionally designated rivers, including those in the Ozark national scenic riverways and the wild and scenic rivers system, are so designated (see Table D).

(O) Outstanding state resource waters—Waters having characteristics identified in section (8) and listed in Table E.

(P) Ozark streams—Streams lying within the Ozark faunal region as described in the *Aquatic Community Classification System for Missouri*, Missouri Department of Conservation, 1989.

(Q) Regulated-flow streams—A stream that derives a majority of its flow from an impounded area with a flow-regulating device.

(R) Water hardness—The total concentration of calcium and magnesium ions expressed as calcium carbonate. For purposes of this rule, it will be determined by the arithmetic average of a representative number of samples from the water body in question or from a similar water body.

(S) Water quality criteria—Chemical, physical and biological properties of water that are necessary to protect beneficial water uses.

(T) Waters of the state—All rivers, streams, lakes and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state which are not entirely confined and located completely upon lands owned, leased or otherwise controlled by a single person or by two (2) or more persons jointly or as tenants in common and includes water of the United States lying within the state.

(U) Zone of initial dilution—A small area of initial mixing below an effluent outfall beyond which acute toxicity criteria must be met.

(V) Zone of passage—A continuous water route necessary to allow passage of organisms with no acutely toxic effects produced on their populations.

(W) Wetlands—Wetlands have been shown to perform a valuable role in water pollution control, groundwater recharge, erosion control, fish and wildlife protection and other valuable environmental functions. As used in this rule, wetlands are those meeting the criteria in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*, January 10, 1989 and future revisions, and which are located in floodplains adjacent to waters listed in Tables G and H and are contiguous with those waters part of the time. It does not include wetlands constructed exclusively for water pollution control purposes.

(X) Whole effluent toxicity tests—A toxicity test conducted under specified laboratory conditions on specific indicator organisms. To estimate chronic and acute toxicity of the effluent in its receiving stream, the effluent may be diluted to simulate the computed percent effluent at the edge of the mixing zone or zone of initial dilution.

(Y) Other definitions as set forth in the Missouri Clean Water Law and 10 CSR 20-10 shall apply to terms used in this rule.

(2) Antidegradation.

(A) When water quality exceeds levels necessary to protect beneficial uses, that quality shall be fully maintained and protected. Water quality may be lowered only if the state finds, after full satisfaction of the intergovernmental coordination and public participation provisions of 10 CSR 20-6.020, that the lowered water quality is necessary to allow important economic and social development. The state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control before allowing any lowering of water quality. The lowered water quality would only be allowable provided that—

1. Existing instream uses are fully maintained and protected;

2. No public health hazard is created; and

3. There is no lowered water quality in outstanding national resource waters or outstanding state resource waters.

(3) General Criteria. The following water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:

(A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;

(B) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;

(C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses; and

(D) Waters shall be free from substances or conditions in sufficient amounts to have a harmful effect on human, animal or aquatic life.

1. There shall be no significant human health hazard from incidental contact with the water. Protection of drinking water supply is limited to aquifers and surface waters designated for raw drinking water supply. Protection of whole-body-contact recreation is limited to classified waters designated for that use.

2. There shall be no acute toxicity to livestock or wildlife watering. Only waters designated for livestock and wildlife watering are considered to be long-term supplies and are subject to the chronic toxicity requirements of the specific criteria.

3. Waters in mixing zones and unclassified waters which support aquatic life on an intermittent basis shall be subject to the following requirements:

A. The acute toxicity criteria of Tables A and B and the requirements of subsection (4)(B); and

B. The following whole effluent toxicity conditions must be satisfied:

(I) Single dilution method. The percent effluent at the edge of the zone of initial dilution will be computed and toxicity tests performed at this percent effluent. These tests must show statistically insignificant mortality on the most sensitive of at least two (2) representative, diverse species; and

(II) Multiple dilution method. An LC_{50} concentration will be derived from a series of test dilutions. The computed percent effluent at the edge of the zone of initial dilution must be less than three-tenths (0.3) of the LC_{50} concentration for the most sensitive of at least two (2) representative, diverse species.

(4) Specific Criteria. The specific criteria shall apply to classified waters and their adjacent wetlands.

(A) The maximum chronic toxicity criteria in Tables A and B shall apply to waters designated for the indicated uses given in Tables G and H. All Table A and B criteria are chronic toxicity criteria, except those specifically identified as acute criteria. Water contaminants shall not cause or contribute to concentrations in excess of these values. However, exceptions may be granted in the following cases:

1. Permanent flow streams when the stream flow is less than seven (7)-day Q_{10};

2. Regulated-flow streams if the flow is less than the minimum release flow agreed upon by the regulating agencies;

3. When the stream or lake is subjected to degradation due to nonpoint sources of pollution above the level of control which can be achieved through the use of feasible and cost-effective best management practices as defined by the Missouri Nonpoint Source Management Plan as approved December, 1989;

4. When natural upstream concentrations of dissolved oxygen are below the desired criteria, wasteload allocations and permits for point source discharges will be developed so that existing natural dissolved oxygen concentrations are maintained;

5. For the natural and unavoidable chemical and physical changes that occur in the hypolimnion of lakes. Streams below impoundments shall meet applicable specific criteria;

6. For mixing zones.

A. The mixing zone shall be exempted from the chronic toxicity requirements of this section for those components of waste that are rendered nontoxic by dilution, dissipation or rapid chemical transformation. Acute numeric criteria of Tables A and B and whole effluent acute toxicity requirements of subparagraph (3)(D)3.B. must be met at all times within the mixing zone, except within the zone of initial dilution.

B. The maximum size of mixing zones and zone of initial dilution will be determined as follows:

(I) Class C streams and streams with seven (7)-day Q_{10} low flows of 0.1 cfs or less.

(a) Mixing zone—length of one-half (1/2) mile. If multiple discharges affect a reach or if zone of passage requirements mandate less extensive mixing zones, shorter mixing zones may be required.

(b) Zone of initial dilution—not allowed;

(II) Streams with seven (7)-day Q_{10} low flow of one-tenth to twenty (0.1—20) cfs—

a. Mixing zone—one-quarter (1/4) of the stream width, cross-sectional area or volume of flow; length one quarter (1/4) mile. If the discharger can document that rapid and complete mixing of the effluent occurs in the receiving stream, the mixing zone may be up to one-half (1/2) of the stream width, cross-sectional area or volume of flow; and

b. Zone of initial dilution—one-tenth (0.1) of the mixing zone width, cross-sectional area or volume of flow;

(III) Streams with seven (7)-day Q_{10} low flow of greater than twenty (20) cfs—

a. Mixing zone—one-quarter (1/4) of stream width, cross-sectional area or volume of flow; length of one-quarter (1/4) mile. The length of the thermal plumes may be allowed to exceed this distance if the biological surveys performed in response to Section 316(a) of the federal Clean Water Act indicate no adverse effect on aquatic life; and

b. Zone of initial dilution—one-tenth (0.1) of the mixing zone width, cross-sectional area or volume of flow; and

(IV) Lakes.

(a) Mixing zone—not to exceed one-quarter (1/4) of the lake width at the discharge point or one hundred feet (100') from the discharge point, whichever is less.

(b) Zone of initial dilution—One-tenth (0.1) of the dimensions of the mixing zone.

C. A mixing zone shall not overlap another mixing zone in a manner that the maintenance of aquatic life in the body of water in the overlapping area would be further adversely affected.

D. Other factors that may further limit the size and location of mixing zones are the size of the river, the volume of discharge, the stream bank configuration, the mixing velocities, other hydrologic or physiographic characteristics and the designated uses of the water, including type of aquatic life supported.

E. Zones of passage must be provided wherever mixing zones are allowed.

F. Mixing zone and zone of initial dilution size limits will normally be based on streams at the seven (7)-day Q_{10} low flow. However, this percent of stream size limits also applies at higher stream flows and discharge limitations may be based on higher stream flows if discharge volume or quality may be adjusted to correlate with stream flow; and

7. For wetlands. Water quality needs will vary depending on the individual characteristics of wetlands. Application of numeric criteria will depend on the specific aquatic life, wildlife and vegetational requirements.

(B) Toxic Substances.

1. Water contaminants shall not cause the criteria in Tables A and B to be exceeded. Concentrations of these substances in bottom sediments or waters shall not harm benthic organisms and shall not accumulate through the food chain in harmful concentrations, nor shall state and federal maximum fish tissue levels for fish consumption be exceeded. More stringent criteria may be imposed if there is evidence of additive or synergistic effects. Effluent toxicity studies or site-specific instream biological studies may be used to develop alternative effluent limits not based on Table A values.

2. For compliance with this rule, metals shall be analyzed by the following methods:

A. Aquatic life protection and human-health protection—fish consumption.

(I) Mercury—total recoverable metals.

(II) All other metals—dissolved metals; and

B. All other beneficial uses—total recoverable metals.

3. Other potentially toxic substances for which sufficient toxicity data are not available may not be released to waters of the state until safe levels are demonstrated through adequate bioassay studies.

4. Drinking water criteria, for substances which are rendered nontoxic by transformation processes in the surface waterbody, shall apply at water supply withdrawal points.

5. Site-specific alternative criteria for human health—fish consumption may be allowed. Designation of this site-specific criteria must follow the established variance request process.

(C) Fecal Coliform Bacteria. For periods when the stream or lake is not affected by stormwater runoff, the fecal coliform count shall not exceed two hundred colonies per one hundred milliliters (200/100 ml) during the recreational season in waters designated for whole-body-contact recreation or at any time in losing streams. The recreational season is from April 1 to October 31.

1. A geometric mean of three (3) consecutive samples exceeding two hundred colonies per one hundred milliliters (200/100 ml) during nonrunoff periods identify potential noncompliance with this rule and may trigger additional sampling.

2. A geometric mean of five (5) samples taken in a thirty (30)-day period exceeding 200/100 ml during nonrunoff periods will verify noncompliance with this rule.

(D) Temperature.

1. For general and limited warm-water fisheries beyond the mixing zone, water contaminant sources shall not raise or lower the temperature of a stream more than five degrees Fahrenheit (5°F). Water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90°F). However, site-specific ambient temperature data and requirements of sensitive resident aquatic species will be considered, when data are available, to establish alternative maxima or deviations from ambient temperatures.

2. For cool-water fisheries beyond the mixing zone, water contaminant sources shall not raise or lower the temperature of a stream more than five degrees Fahrenheit (5°F). Water contaminant sources shall not cause or contribute to stream temperature in excess of eighty-four degrees Fahrenheit (84°F).

3. For cold-water fisheries beyond the mixing zone, water contaminant sources shall not raise or lower the temperature of the water body more than two degrees Fahrenheit (2°F). Water contaminant sources shall not cause or contribute to temperatures above sixty-eight degrees Fahrenheit (68°F).

4. Water contaminant sources shall not cause any measurable rise in the temperature of lakes. An increase is allowable for Lake Springfield, Thomas Hill Reservoir and Montrose Lake; however, discharges from these lakes must comply with temperature limits for streams.

5. For the Mississippi River Zones 1A and 2, the water temperature outside the mixing zone shall not exceed the maximum limits indicated in the following list during more than one percent (1%) of the time in any calendar year. In Zone 1B, limits may not be exceeded more than five percent (5%) of the time in a calendar year. At no time shall the

.iver water temperature outside of a mixing zone of twenty-five percent (25%) of the cross-sectional area or volume of the river exceed the listed limits by more than three degrees Fahrenheit (3°F).

	A,B (°F)	C (°F)
January	45	50
February	45	50
March	57	60
April	68	70
May	78	80
June	86	87
July	88	89
August	88	89
September	86	87
October	75	78
November	65	70
December	52	57

A = Zone 1A—Des Moines River to Lock and Dam No. 25

B = Zone 1B—Lock and Dam No. 25 to Lock and Dam No. 26.

C = Zone 2—Lock and Dam No. 26 to the Missouri-Arkansas state line

(E) pH. Water contaminants shall not cause pH to be outside of the range of 6.5—9.0.

(F) Taste- and Odor-Producing Substances. ıste- and odor-producing substances shall be limited to concentrations in the streams or lakes that will not interfere with beneficial uses of the water. For those streams and lakes designated for drinking water supply use, the taste- and odor-producing substances shall be limited to concentrations that will not interfere with the production of potable water by reasonable water treatment processes.

(G) Turbidity and Color. Water contaminants shall not cause or contribute to turbidity or color that will cause substantial visible contrast with the natural appearance of the stream or lake or interfere with beneficial uses.

(H) Solids. Water contaminants shall not cause or contribute to solids in excess of a level that will interfere with beneficial uses. The stream or lake bottom shall be free of materials which will adversely alter the composition of the benthos, interfere with the spawning of fish or development of their eggs or adversely change the physical or chemical nature of the bottom.

(I) Radioactive Materials. All streams and lakes shall conform with state and federal limits for radionuclides established for drinking water supply.

(J) Dissolved Oxygen. Water contaminants shall not cause the dissolved oxygen to be wer than the levels described in Table A or as icated in paragraph (4)(A)4.

(K) Total Dissolved Gases. Operation of impoundments shall not cause the total dissolved gas concentrations to exceed one hundred ten percent (110%) of the saturation value for gases at the existing atmospheric and hydrostatic pressures.

(L) Sulfate and Chloride Limit for Protection of Aquatic Life.

1. Streams with seven (7)-day Q_{10} low flow of less than one (1) cubic foot per second. The concentration of chloride plus sulfate shall not exceed one thousand milligrams per liter (1000 mg/l) at the seven (7)-day Q_{10} low flow.

2. Class P1, L1, L2 and L3 waters and streams with seven (7)-day Q_{10} low flow of more than one (1) cubic foot per second. The total chloride plus sulfate concentration shall not exceed the estimated natural background concentration by more than twenty percent (20%) at the sixty (60)-day Q_2 low flow.

3. If higher concentrations can be demonstrated through bioassays or studies not to be detrimental to indigenous aquatic life, then an appropriate higher concentration shall be allowed.

(M) Carcinogenic Substances. Carcinogenic substances shall not exceed concentrations in water which correspond to the 10^{-6} cancer risk rate. This risk rate equates to one (1) additional cancer case in a population of one (1) million with lifetime exposure. Derivation of this concentration assumes average water and fish consumption amounts. Federally established final maximum contaminant levels for drinking water supply shall supersede drinking water supply criteria developed in this manner.

(N) All methods of sample collection, preservation and analysis used in applying criteria in these standards shall be in accord with those prescribed in the latest edition of *Standard Methods for the Examination of Water and Wastewater* or other procedures approved by the Environmental Protection Agency and the Missouri Department of Natural Resources.

(O) Criteria to protect designated uses are based on current technical literature, especially the Environmental Protection Agency's publication, *Quality Criteria for Water*, 1986. Criteria may be modified or expanded as additional information is developed or as needed to define narrative criteria for particular situations or locations.

(5) Groundwater.

(A) Water contaminants shall not cause or contribute to exceedence of Table A, Column VII limits in aquifers and caves. Substances not listed in Table A shall be limited so that drinking water, livestock watering and irrigation uses are protected.

(B) When criteria in Column I or II of Table A are more stringent than Column VII criteria, appropriate Column I or II criteria shall apply to waters in caves and to aquifers which contribute an important part of base flow of surface waters designated for aquatic life protection. Other substances not listed in Table A shall be limited in these aquifers and caves so that the aquatic life use is protected.

(C) Column VII and other criteria shall apply—

1. Vertically, in any part of the aquifer, including the point at which the pollutant enters the aquifer. A specific monitoring depth requirement for releases to aquifers is included in 10 CSR 20-7.015(7)(A); and

2. Areally, at the point groundwater becomes waters of the state. This will normally be the next downgradient property boundary.

(D) For aquifers in which contaminant concentrations exceed Column VII criteria or other protection criteria, and existing and potential uses are not impaired, alternative site-specific criteria may be allowed. To allow alternative criteria, the management authority must demonstrate that alternative criteria will not impair existing and potential uses. The demonstration must consider the factors and be subject to the review requirements of 10 CSR 20-7.015(7)(F).

(6) No water contaminant except uncontaminated cooling water, permitted stormwater discharges in compliance with permit conditions and excess wet-weather bypass discharges not interfering with beneficial uses, shall be discharged to streams listed in Table F. Existing interim discharges may be allowed until interceptors are available.

(7) Outstanding National Resource Waters. Under section (2), antidegradation section of this rule, new releases to outstanding national resource waters from any source other than publicly-owned waste treatment facilities and mine dewatering water are prohibited and releases from allowed facilities are subject to special effluent limitations as required in 10 CSR 20-7.015(6)(B)3. Table D contains a list of outstanding national resource waters.

(8) Outstanding State Resource Waters.

(A) The commission wishes to recognize certain high-quality waters that may require exceptionally stringent water-quality management requirements to assure conformance with the antidegradation policy. The degree of management requirements will be decided on an individual basis. To qualify for inclusion, all of the following criteria must be met. The waters listed in Table E must—

1. Have a high level of aesthetic or scientific value;

2. Have an undeveloped watershed; and
3. Be located on or pass through state- or federally-owned lands.

(9) Compliance with new or revised National Pollutant Discharge Elimination System (NPDES) or Missouri operating permit limitations based on criteria in this rule shall be achieved with all deliberate speed and no later than three (3) years from the date of issuance of the permit.

(10) Severance. If a section, subsection, paragraph, sentence, clause, phrase or any part of this rule be declared unconstitutional or invalid for any reason, the remainder of this rule shall not be affected and shall remain in full force and effect.

(11) Effective Date. This rule becomes effective immediately upon adoption and compliance with the requirements of subsection 644.036.3. of the Missouri Clean Water Law and Chapter 536, RSMo.

Auth: sections 644.021 and 644.026, RSMo (Cum. Supp. 1990). Original rule filed May 13, 1977, effective Dec. 11, 1977. Amended: Filed Oct. 15, 1980, effective April 11, 1981. Amended: Filed July 12, 1984, effective Dec. 13, 1984. Rescinded and readopted: Filed Aug. 4, 1987, effective Dec. 12, 1987. Amended: Filed Nov. 14, 1988, effective April 15, 1989. Rescinded and readopted: Filed Sept. 5, 1990, effective March 14, 1991.

TABLE H—STREAM CLASSIFICATIONS AND USE DESIGNATIONS

WATERBODY	CLASS	MILES	FROM	TO	COUNTY	COUNTY 2	IRR	LWW	AQL	CLF	CDF	WBC	BTG	DWS	IND
Mill Cr.	C	4.0	Mouth	3,36N,8E	Ste. Genevieve			x	x						x
Mill Cr.	P	12.0	Mouth	8,37N,3E	St. Francois	Washington		x	x						
Mill Cr.	C	2.0	8,37N,3E	18,37N,3E	Washington			x	x						
Trib. to Mill Cr.	C	0.5	Mouth	19,37N,3E	Washington			x	x						
Mill Cr.	P	3.0	Mouth	36,36N,3E	Washington			x	x						
Mill Cr.	C	0.5	36,36N,3E	36,36N,3E	Washington			x	x						
Mill Cr.	P	2.0	Mouth	8,27N,1W	Carter			x	x			x			
Mill Cr.	C	2.0	8,27N,1W	1,27N,2W	Carter			x	x						
Mill Cr.	P	3.5	Mouth	32,33N,7E	Madison			x	x						
Mill Cr.	C	1.0	32,33N,7E	33,33N,7E	Madison			x	x						
Mill Cr.	C	2.0	Mouth	30,31N,5E	Wayne	Madison		x	x						
Mill Cr.	P	2.5	Mouth	24,21N,33W	McDonald			x	x			x			
Mill Spring Cr.	P	1.0	Mouth	3,40N,8W	Maries			x	x						
Miller Cr.	C	6.0	Mouth	3,26N,4E	Wayne			x	x						
Millers Cr.	C	1.5	Mouth	14,47N,11W	Callaway			x	x						
Milligan Cr.	C	8.0	Mouth	18,53N,12W	Monroe			x	x						
Mine a Breton Cr.	P	11.0	7,38N,2E	Hwy. 185	Washington			x	x						
Mine a Breton Cr.	C	2.5	Hwy. 185	23,37N,2E	Washington			x	x						
Trib. to Mine a Breton Cr.	C	1.0	Mouth	24,37N,2E	Washington			x	x						
Mineral Br.	C	2.0	Mouth	17,44N,15W	Moniteau			x	x						
Trib. to Mineral Br.	C	0.5	Mouth	16,44N,15W	Moniteau			x	x						
Mineral Fk.	P	15.0	Mouth	7,38N,2E	Washington			x	x	x		x			
Trib. to Mineral Fk.	C	2.0	Mouth	33,39N,3E	Washington			x	x						
Mingo Cr.	C	2.0	Mouth	5,26N,8E	Stoddard			x	x						
Mingo Ditch	P	16.0	Mouth	32,27N,8E	Stoddard			x	x						
Minnow Br.	C	1.0	Mouth	25,41N,20W	Benton			x	x						
Minor Cr.	C	1.5	Mouth	14,33N,3E	Iron			x	x						
Mississippi R.	P	124.5	State Line	Ohio R.	Pemiscot	Mississippi	x	x	x				x	x	x
Mississippi R.	P	200.5	Ohio R.	Missouri R.	Mississippi	St. Charles	x	x	x				x	x	x
Mississippi R.	P	165.0	Missouri R.	Des Moines R.	St. Charles	Clark		x	x			x	x	x	x
Missouri R.	P	100.0	Mouth	Gasconade R.	St. Louis	Gasconade	x	x	x				x	x	x
Missouri R.	P	129.0	Gasconade R.	Chariton R.	Gasconade	Chariton	x	x	x				x	x	x
Missouri R.	P	125.0	Chariton R.	Kansas R.	Chariton	Jackson	x	x	x				x	x	x
Missouri R.	P	179.0	Kansas R.	State Line	Jackson	Atchison	x	x	x				x	x	x
Trib. to Missouri R.	P1	2.5	Mouth	21,44N,1E	St. Charles			x	x						
Trib. to Missouri R.	C	6.0	Mouth	23,51N,23W	Saline			x	x						
Trib. to Missouri R.	P	1.5	Mouth	26,47N,14W	Moniteau			x	x						
Trib. to Missouri R.	C	0.5	26,47N,14W	26,47N,14W	Moniteau			x	x						
Mistaken Cr.	P	6.0	Mouth	20,42N,7W	Osage			x	x						
Mistaken Cr.	C	1.5	20,42N,7W	30,42N,7W	Osage			x	x						
Moccasin Cr.	C	2.0	Mouth	26,63N,33W	Gentry			x	x						
Monegaw Cr.	P	2.0	Mouth	21,38N,27W	St. Clair			x	x			x	x		
Monegaw Cr.	C	10.0	21,38N,27W	9,39N,28W	St. Clair			x	x				x		
Moniteau Cr.	P	20.5	Mouth	Hwy. 124	Howard			x	x				x		
Moniteau Cr.	C	13.5	Hwy. 124	16,52N,14W	Howard	Randolph		x	x						
Moniteau Cr.	P	17.0	Mouth	16,46N,15W	Cole	Moniteau		x	x				x		
Moniteau Cr.	C	15.5	16,46N,15W	21,46N,15W	Moniteau	Cooper		x	x				x		
Montgomery Br.	C	6.5	15,38N,23W	6,37N,22W	Hickory			x	x						
Mooney Br.	C	2.0	Mouth	3,33N,10W	Texas			x	x						
Moore Br.	C	2.0	Mouth	28,35N,31W	Vernon			x	x						

IRR LWW AQL CLF CDF WBC BTG DWS IND

IRR—Irrigation
LWW—Livestock & Wildlife Watering
AQL—Protection of Warm Water Aquatic Life and Human Health—Fish Consumption
CLF—Cool Water Fishery
CDF—Cold Water Fishery
WBC—Whole Body Contact Recreation
BTG—Boating and Canoeing
DWS—Drinking Water Supply
IND—Industrial

TABLE H—STREAM CLASSIFICATIONS AND USE DESIGNATIONS

WATERBODY	CLASS	MILES	FROM	TO	COUNTY	COUNTY 2	IRR	LWW	AQL	CLF	CDF	WBC	BTG	DWS	IND
Ramsey Br.	P	6.5	Mouth	33,31N,13E	Cape Girardeau			x	x				x		
Ramsey Br.	C	1.0	33,31N,13E	28,31N,13E	Cape Girardeau			x	x						
Ramsey Cr.	C	7.0	Mouth	Sur 1709(9),52N,1E	Pike			x	x						
Rattlesnake Cr.	C	3.0	Mouth	3,56N,25W	Livingston			x	x						
Red Oak Cr.	P	5.0	Mouth	28,42N,4W	Franklin	Gasconade		x	x						
Red Oak Cr.	C	9.0	28,42N,4W	16,41N,5W	Gasconade			x	x						
Reese Fk.	C	7.0	Mouth	28,53N,12W	Monroe			x	x						
Reid Cr.	C	2.0	Mouth	Sur 1717,51N,2W	Lincoln			x	x						
Reid Cr.	C	1.5	Mouth	5,38N,27W	St. Clair			x	x						
Reisobel Br.	C	1.0	Mouth	22,40N,6W	Gasconade			x	x						
Richland Cr.	C	4.0	Mouth	29,48N,9W	Callaway			x	x						
Richland Cr.	P	3.5	Mouth	Hwy. 87	Howard			x	x						
Richland Cr.	C	2.0	Hwy. 87	16,50N,17W	Howard			x	x						
Richland Cr.	P	8.0	13,45N,19W	17,44N,18W	Morgan			x	x			x	x		
Richland Cr.	C	10.0	17,44N,18W	22,43N,18W	Morgan			x	x			x	x		
Richland Cr.	C	0.5	Mouth	6,44N,6W	Gasconade			x	x						
Ricky Cr.	C	6.0	Mouth	15,39N,28W	St. Clair			x	x						
Riggin Br.	C	1.5	Mouth	21,60N,35W	Andrew			x	x						
Rings Cr.	P	5.0	Mouth	23,29N,4E	Wayne			x	x			x			
Rings Cr.	C	0.5	23,29N,4E	27,29N,4E	Wayne			x	x						
Trib. to Rings Cr.	C	0.5	Mouth	26,29N,4E	Wayne			x	x						
Trib. to Rings Cr.	C	1.0	Mouth	23,29N,4E	Wayne			x	x						
Rippee Cr.	P	4.5	Mouth	13,25N,15W	Douglas			x	x						
Rippee Cr.	C	2.0	13,25N,15W	14,25N,15W	Douglas			x	x						
Rising Cr.	P	1.0	Mouth	M.P.R.R. tracks	Cole			x	x						
Rising Cr.	C	4.0	M.P.R.R. tracks	36,44N,11W	Cole			x	x						
Rivaux Cr.	P1	1.5	Mouth	21,44N,10W	Callaway			x	x						
Rivaux Cr.	C	3.5	21,44N,10W	8,44N,10W	Callaway			x	x						
River aux Vases	P	17.0	Mouth	18,36N,8E	Ste. Genevieve			x	x			x			
River aux Vases	C	4.0	18,36N,8E	27,36N,7E	Ste. Genevieve			x	x						
River des Peres	P	1.5	Mouth	Gravois Cr.	St. Louis City			x	x						
River des Peres	C	1.0	Gravois Cr.	Morgan Ford Road	St. Louis City			x	x						
Roach Lake	C	2.5	29,57N,23W	25,57N,24W	Livingston			x	x						
Roaring R.	P	7.0	Mouth	34,22N,27W	Barry			x	x		x	x	x		
Roark Br.	C	1.0	Mouth	23,43N,14W	Cole			x	x						
Roark Cr.	C	3.0	Mouth	36,23N,22W	Taney			x	x		x	x	x		
Roark Cr.	C	4.0	36,23N,22W	15,23N,22W	Taney			x	x			x	x		
Roberts Br.	C	1.0	Mouth	5,54N,32W	Clinton			x	x						
Rock Br.	C	3.0	Mouth	24,36N,3W	Crawford			x	x						
Rock Br.	P	2.0	State Line	12,26N,34W	Newton			x	x						
Rock Cr.	C	4.0	Mouth	34,62N,12W	Knox			x	x						
Rock Cr.	P	2.0	Mouth	30,64N,41W	Atchison			x	x						
Rock Cr.	C	18.0	30,64N,41W	17,66N,40W	Atchison			x	x						
Rock Cr.	P	1.0	Mouth	9,45N,13W	Cole			x	x						
Rock Cr.	C	3.0	9,45N,13W	18,45N,13W	Cole			x	x						
Rock Cr.	C	1.0	Mouth	19,43N,11W	Cole			x	x						
Rock Cr.	C	3.0	Mouth	24,33N,12W	Texas			x	x						
Rock Cr.	P	5.0	Mouth	2,42N,5E	Jefferson			x	x						
Rock Cr.	C	3.0	2,42N,5E	Hwy. 21	Jefferson			x	x						
Rock Cr.	P	3.0	36,22N,26W	24,22N,26W	Barry			x	x						
							IRR	LWW	AQL	CLF	CDF	WBC	BTG	DWS	IND

IRR—Irrigation
LWW—Livestock & Wildlife Watering
AQL—Protection of Warm Water Aquatic Life and Human Health—Fish Consumption
CLF—Cool Water Fishery
CDF—Cold Water Fishery
WBC—Whole Body Contact Recreation
BTG—Boating and Canoeing
DWS—Drinking Water Supply
IND—Industrial

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

TELEPHONE OR CONFERENCE RECORD

FILE: Hubert Wheeler State School | DATE: November 12, 1993

TELEPHONE:

Incoming (X)
Outgoing ( )

CONFERENCE:

Field ( )
Office ( )

SUBJECT: Future Action at the Hubert Wheeler State School

PERSONS INVOLVED:

NAME	REPRESENTING
Ms. Julie A. Bloss	MDNR/Hazardous Waste Program/Superfund
Mr. Ed Alizadeh	Geotechnology (314) 997-7440

SUMMARY OF CONVERSATION:

Mr. Alizadeh returned my phone call of November 9, 1993. I told him that members of Superfund staff had visited the school on October 7, 1993. I explained that I was the staff member assigned to prepare a desk-top report of the site, but that Al Wallen was continuing to investigate. Mr. Alizadeh said that he had no knowledge of our visit. I told him that our staff notified the school superintendent at the time of their visit.

I asked Mr. Alizadeh about the two drums that were observed in the trash dumpster at the school. Mr. Alizadeh said that one was filled with drill cuttings, the other with rinsate water. Mr. Alizadeh said that these drums were no longer on-site. The drill cuttings were treated as a special waste and hauled to BFI. The rinsate water was discharged into the sewer under a permit from the St. Louis Metropolitan Sewer District.

I asked Mr. Alizadeh what were the future plans for Hubert Wheeler State School? Mr. Alizadeh said that he could not answer that. He said that Geotechnology had collected 10 soil borings and prepared a site assessment report for the site, which was submitted to the State of Missouri, Office of Administration (OA), Division of Design and Construction, about one month ago. Mr. Alizadeh has not received any comments back from OA. I asked Mr. Alizadeh why the report was submitted to the Division of Design and Construction. Mr. Alizadeh explained that the state school requested work through the Division of Design and Construction. Mr. Alizadeh thought that the site assessment report was currently being reviewed by Mr. Walter Johannpeter. Mr. Gerald Bonnot is Mr. Alizadeh's contact person at the Division of Design and Construction. Mr. Alizadeh is also in contact with Mr. Ron Littich of the Department of Elementary and Secondary Education. I thanked Mr. Alizadeh for this information and told him that either Al or I would contact OA.

ACTION TAKEN:

I will discuss this information with Al Wallen, Superfund Investigator. We will contact Mr. Bonnot and Mr. Littich and try to obtain a copy of the site assessment report.

Julie A. Bloss

Julie A. Bloss
Environmental Specialist

JAB:so

c: Al Wallen, Superfund

TENTATIVE DISPOSITION

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 12

United States Department of the Interior [redacted]

FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

IN REPLY REFER TO:

RECEIVED
JUN 15 1993

FWS/AES-MFO

JUN 14 1993

Mr. Edwin D. Knight
Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program - Superfund Section
P.O. Box 176
Jefferson City, Missouri 65102-0176

Dear Mr. Knight:

This is in response to your letter dated June 3, 1993, requesting information from the U.S. Fish and Wildlife Service (Service) for sensitive environments or wetlands located near twelve sites where hazardous substances may have been released into the environment.

Endangered or threatened species do occur within a four mile radius of a few of the sites, or within fifteen river miles downstream of the site when located on a water body. The following is a list of those sites and the species found in the near vicinity.

Site	County	Species
Statman Lumber	Maries	Gray bat (*Myotis grisescens*)
Vista Drum Site	St. Clair	Geocarpon (*Geocarpon minimum*)
Armontrout Park	Cole	Running Buffalo Clover (*Trifolium stoloniferum*)
Valley Park 8th Street Drum	St. Louis	Pink Mucket Pearly Mussel (*Lampsilis abrupta*)
Doe Run Golf Course	Jefferson	Bald Eagle (*Haliaeetus leucocephalus*)

Unfortunately the entire state of Missouri has not been mapped by the Service's National Wetland Inventory (NWI). Maps for the Neosho Medical Waste, Statman Lumber, and Vista Drum sites do not exist. However, each of these sites are situated on or near an intermittent stream. Palustrine wetlands usually occur along these streams.

The Service has mapped wetlands on aerial photographs for the Oberhaus Residence, Armontrout Park, KCPL Northeast Station, Arrow Truck Sales, and K-

Mart sites. We were unable to make legible copies of the aerial photographs so we have interpreted the maps according to the wetlands and deepwater habitat classification system[1] defined by the Service. If you wish to obtain copies of the maps yourself, they can be acquired by calling 1-800-USA-MAPS.

The Oberhaus Residence site sits on a seasonal, emergent, palustrine wetland. Wetlands which occur in the vicinity of the sites (Oberhaus Residence, Armontrout Park, and KCPL Northeast Station) along the Missouri River are 1) temporary broad-leafed deciduous, forested, palustrine wetlands; 2) temporary, emergent, palustrine wetlands; and 3) permanent, lower perennial riverine wetlands.

The K-Mart and Arrow Truck Sales sites are both located on or near narrow streams. Several types of wetlands are situated along these two streams, including 1) intermittently exposed, lower perennial riverine wetlands with unconsolidated bottoms; 2) seasonal, broad-leafed deciduous, forested, palustrine wetlands; 3) temporary, broad-leafed deciduous, forested, palustrine wetlands; and 4) emergent palustrine wetlands.

Enclosed are copies of draft NWI maps for the Doe Run Golf Course, Valley Park 8th Street Drum, and Crocket Residence sites for your use. Copies of the entire quadrangles can be obtained by calling the number listed above. Also enclosed is a copy of the Wetlands and Deepwater Habitats Classification key for the NWI maps.

No wetlands occur near the H. Wheeler State School site.

We appreciate the opportunity to provide this information. Should you have questions, or if we can be of any further assistance, please contact Ms. Colette Charbonneau at the address above, or by telephone at (314)876-1911.

Sincerely,

Jerry J. Brabander
Field Supervisor

cc: FWS; Twin Cities, MN (Attn: T.J. Miller)
MDC; Jefferson City, MO (Attn: Dan Dickneite)
MDC; Jefferson City, MO (Attn: Dennis Figg)
MDNR; Jefferson City, MO (Attn: Nick Di Pasquale)
EPA; Kansas City, MO (Attn: Jim MacDonald)

CSC:cc:1680/XCHWI12S

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[1]Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, Biological Services Program. FWS/OBS-79/31.

June 14, 1993

Dept. of Natural Resources
Superfund Site
Hubert Wheeler State School
St. Louis County

The following species and/or natural communities are known from the vicinity of the project site.

SCIENTIFIC NAME	COMMON NAME	FED STATUS	STATE STATUS	DATE	TOWN/RANGE	SEC	MANAGED AREA
ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE		R	1988	045N006E	28	

The following species are historically known from the project area.

SCIENTIFIC NAME	COMMON NAME	FED STATUS	STATE STATUS
MACRHYBOPSIS MEEKI	SICKLEFIN CHUB	C2	R
FONTIGENS ANTROECETES	A CAVE SNAIL		E
AGALINIS AURICULATA	AURICULATE FALSE FOXGLOVE	C2	R
CAREX STRAMINEA	STRAW SEDGE		SU
ECHINACEA ANGUSTIFOLIA	NARROW-LEAVED CONEFLOWER		SU
STACHYS HYSSOPIFOLIA VAR AMBIGUA	HEDGE NETTLE		EXT

FEDERAL STATUS - The federal status is derived from the provisions of the federal Endangered Species Act, which is administered by the U.S. Fish and Wildlife Service. The Endangered Species Act provides federal protection for plants and animals listed as Endangered or Threatened. E = Endangered T = Threatened A,B,C = Candidate for Federal listing

MISSOURI STATUS - The state status is determined by the Department of Conservation under Constitutional authority. Rule 3CSR10-4.111 of the Wildlife Code of Missouri and certain state statutes apply to state listed species. E = Endangered R = Rare SU = Status Undetermined WL = Watch List EXT = Extirpated EXTINCT = No longer living anywhere

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 13

Table 1. Selected Population and Housing Characteristics: 1990
[redacted] Missouri

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991. The user should note that there are limitations to many of these data. Please refer to the technical documentation provided with Summary Tape File 1A for a further explanation on the limitations of the data.

Total population	396,685
SEX	
Male	180,680
Female	216,005
AGE	
Under 5 years	31,355
5 to 17 years	68,685
18 to 20 years	17,071
21 to 24 years	24,351
25 to 44 years	123,407
45 to 54 years	31,905
55 to 59 years	16,030
60 to 64 years	17,880
65 to 74 years	33,428
75 to 84 years	24,184
85 years and over	8,389
Median age	32.8
Under 18 years	100,040
Percent of total population	25.2
65 years and over	66,001
Percent of total population	16.6
HOUSEHOLDS BY TYPE	
Total households	164,931
Family households (families)	90,945
Married-couple families	50,557
Percent of total households	30.7
Other family, male householder	6,524
Other family, female householder	33,864
Nonfamily households	73,986
Percent of total households	44.9
Householder living alone	64,677
Householder 65 years and over	26,519
Persons living in households	385,916
Persons per household	[redacted]
GROUP QUARTERS	
Persons living in group quarters	10,769
Institutionalized persons	5,900
Other persons in group quarters	4,869
RACE AND HISPANIC ORIGIN	
White	202,085
Black	188,408
Percent of total population	47.5
American Indian, Eskimo, or Aleut	950
Percent of total population	0.2
Asian or Pacific Islander	3,733
Percent of total population	0.9
Other race	1,509
Hispanic origin (of any race)	5,124
Percent of total population	1.3

Total housing units	194,919
OCCUPANCY AND TENURE	
Occupied housing units	164,931
Owner occupied	74,352
Percent owner occupied	45.1
Renter occupied	90,579
Vacant housing units	29,988
For seasonal, recreational, or occasional use	215
Homeowner vacancy rate (percent)	3.3
Rental vacancy rate (percent)	13.2
Persons per owner-occupied unit	2.59
Persons per renter-occupied unit	2.14
Units with over 1 person per room	8,662
UNITS IN STRUCTURE	
1-unit, detached	71,089
1-unit, attached	6,423
2 to 4 units	72,951
5 to 9 units	11,322
10 or more units	31,056
Mobile home, trailer, other	2,078
VALUE	
Specified owner-occupied units	55,988
Less than $50,000	27,375
$50,000 to $99,999	24,320
$100,000 to $149,999	2,565
$150,000 to $199,999	833
$200,000 to $299,999	509
$300,000 or more	386
Median (dollars)	50,700
CONTRACT RENT	
Specified renter-occupied units paying cash rent	87,400
Less than $250	43,185
$250 to $499	40,024
$500 to $749	3,429
$750 to $999	600
$1,000 or more	162
Median (dollars)	252
RACE AND HISPANIC ORIGIN OF HOUSEHOLDER	
Occupied housing units	164,931
White	95,899
Black	66,850
Percent of occupied units	40.5
American Indian, Eskimo, or Aleut	421
Percent of occupied units	0.3
Asian or Pacific Islander	1,288
Percent of occupied units	0.8
Other race	473
Hispanic origin (of any race)	1,905
Percent of occupied units	1.2

approx 2/3 = 264,457

Table 1. Selected Population and Housing Characteristics: 1990
St. Louis County, Missouri

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991. The user should note that there are limitations to many of these data. Please refer to the technical documentation provided with Summary Tape File 1A for a further explanation on the limitations of the data.

Total population	993,529
SEX	
Male	473,533
Female	519,996
AGE	
Under 5 years	69,322
5 to 17 years	175,073
18 to 20 years	38,072
21 to 24 years	51,643
25 to 44 years	325,566
45 to 54 years	109,842
55 to 59 years	46,953
60 to 64 years	47,060
65 to 74 years	74,707
75 to 84 years	41,714
85 years and over	13,577
Median age	34.6
Under 18 years	244,395
Percent of total population	24.6
65 years and over	129,998
Percent of total population	13.1
HOUSEHOLDS BY TYPE	
Total households	380,110
Family households (families)	270,421
Married-couple families	219,468
Percent of total households	57.7
Other family, male householder	10,296
Other family, female householder	40,657
Nonfamily households	109,689
Percent of total households	28.9
Householder living alone	93,532
Householder 65 years and over	35,078
Persons living in households	975,815
Persons per household	2.57
GROUP QUARTERS	
Persons living in group quarters	17,714
Institutionalized persons	12,586
Other persons in group quarters	5,128
RACE AND HISPANIC ORIGIN	
White	836,232
Black	139,318
Percent of total population	14.0
American Indian, Eskimo, or Aleut	1,477
Percent of total population	0.1
Asian or Pacific Islander	14,167
Percent of total population	1.4
Other race	2,335
Hispanic origin (of any race)	9,811
Percent of total population	1.0

Total housing units	401,839
OCCUPANCY AND TENURE	
Occupied housing units	380,110
Owner occupied	280,843
Percent owner occupied	73.9
Renter occupied	99,267
Vacant housing units	21,729
For seasonal, recreational, or occasional use	819
Homeowner vacancy rate (percent)	1.8
Rental vacancy rate (percent)	9.4
Persons per owner-occupied unit	2.75
Persons per renter-occupied unit	2.04
Units with over 1 person per room	5,774
UNITS IN STRUCTURE	
1-unit, detached	288,249
1-unit, attached	14,022
2 to 4 units	27,437
5 to 9 units	22,921
10 or more units	45,595
Mobile home, trailer, other	3,615
VALUE	
Specified owner-occupied units	255,348
Less than $50,000	37,093
$50,000 to $99,999	126,865
$100,000 to $149,999	49,130
$150,000 to $199,999	19,082
$200,000 to $299,999	13,900
$300,000 or more	9,278
Median (dollars)	83,500
CONTRACT RENT	
Specified renter-occupied units paying cash rent	95,449
Less than $250	10,386
$250 to $499	63,141
$500 to $749	17,962
$750 to $999	2,533
$1,000 or more	1,427
Median (dollars)	397
RACE AND HISPANIC ORIGIN OF HOUSEHOLDER	
Occupied housing units	380,110
White	327,643
Black	47,231
Percent of occupied units	12.4
American Indian, Eskimo, or Aleut	557
Percent of occupied units	0.1
Asian or Pacific Islander	4,044
Percent of occupied units	1.1
Other race	635
Hispanic origin (of any race)	3,092
Percent of occupied units	0.8

approx ½ = 496,765

Total 4mi ≅ 761,222

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 15

MISSOURI WATER ATLAS 1986

Missouri Department of Natural Resources

Division of Geology and Land Survey

This publication may be purchased from the Missouri Department of Natural Resources, Division of Geology and Land Survey, P.O. Box 250, Rolla, MO 65401 (314-364-1752).

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MISSOURI WATER ATLAS, 1986, Missouri Department of Natural Resources, Division of Geology and Land Survey, 100 p., 154 figs., 74 tbls. Revised from 1982 edition.

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Karst area

K Local karst present

Springs

Losing stream reaches

Refer to table 9 for names and mileage of losing streams

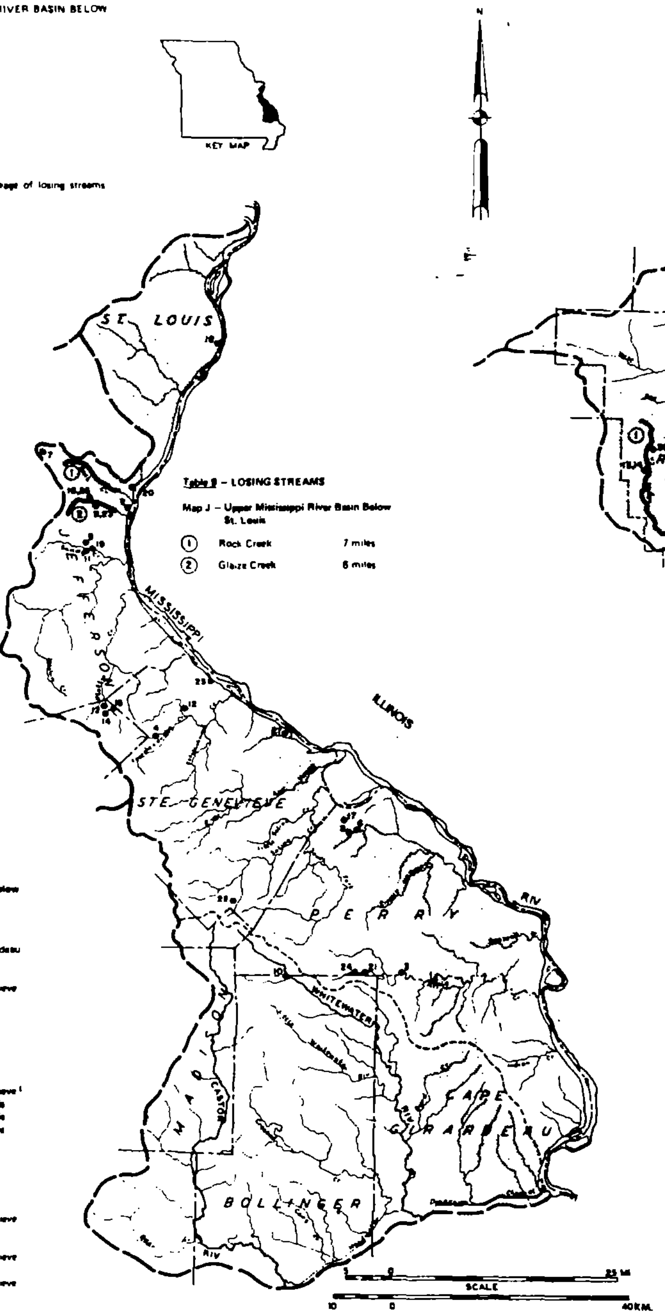


Table 9 – LOSING STREAMS

Map J – Upper Mississippi River Basin Below St. Louis

(1)	Rock Creek	7 miles
(2)	Glaize Creek	6 miles

Table 8 – SPRINGS

Map J – Upper Mississippi River Basin Below St. Louis

No.	Spring	County
1	Abernathy	Cape Girardeau
2	Barnhart	Jefferson
3	Berkbigler	Perry
4	Blue	Ste Genevieve
5	Blue Spring Branch	Perry
6	Blue Spring Branch	Perry
7	Boemler	Jefferson
8	Glenn	Jefferson
9	Glen	Jefferson
10	Hahn	Bollinger
11	Jacobsen	Jefferson
12	Josh Bailey	Ste Genevieve
13	Koester No 1	St. Francois
14	Koester No 2	St Francois
15	Koester No 3	St Francois
16	Kraus	Jefferson
17	Lithium	Perry
18	Market Street	St Louis
19	Martin	Jefferson
20	Montesano	Jefferson
21	Mrs Murphy	Perry
22	Nations Mill	Ste Genevieve
23	Pevely	Jefferson
24	Schumer	Perry
25	Snell Hollow	Ste Genevieve
26	Stuckmeyer	Jefferson
27	Valle	Ste Genevieve

Figure 44K – LOWER MISSISSIPPI BLACK RIVER BASIN

Karst area

K Local karst present

Springs

Losing stream reaches

Refer to table 9 for names and mileage of losing streams

Table 9 – LOSING STREAMS

Map K – Lower Mississippi-Black River Basin

(1)	Logan Creek and tributaries	30 miles
(2)	Sinking Creek	18 miles
(3)	Big Brushy Creek	3 miles
(4)	Cane Creek	2 miles

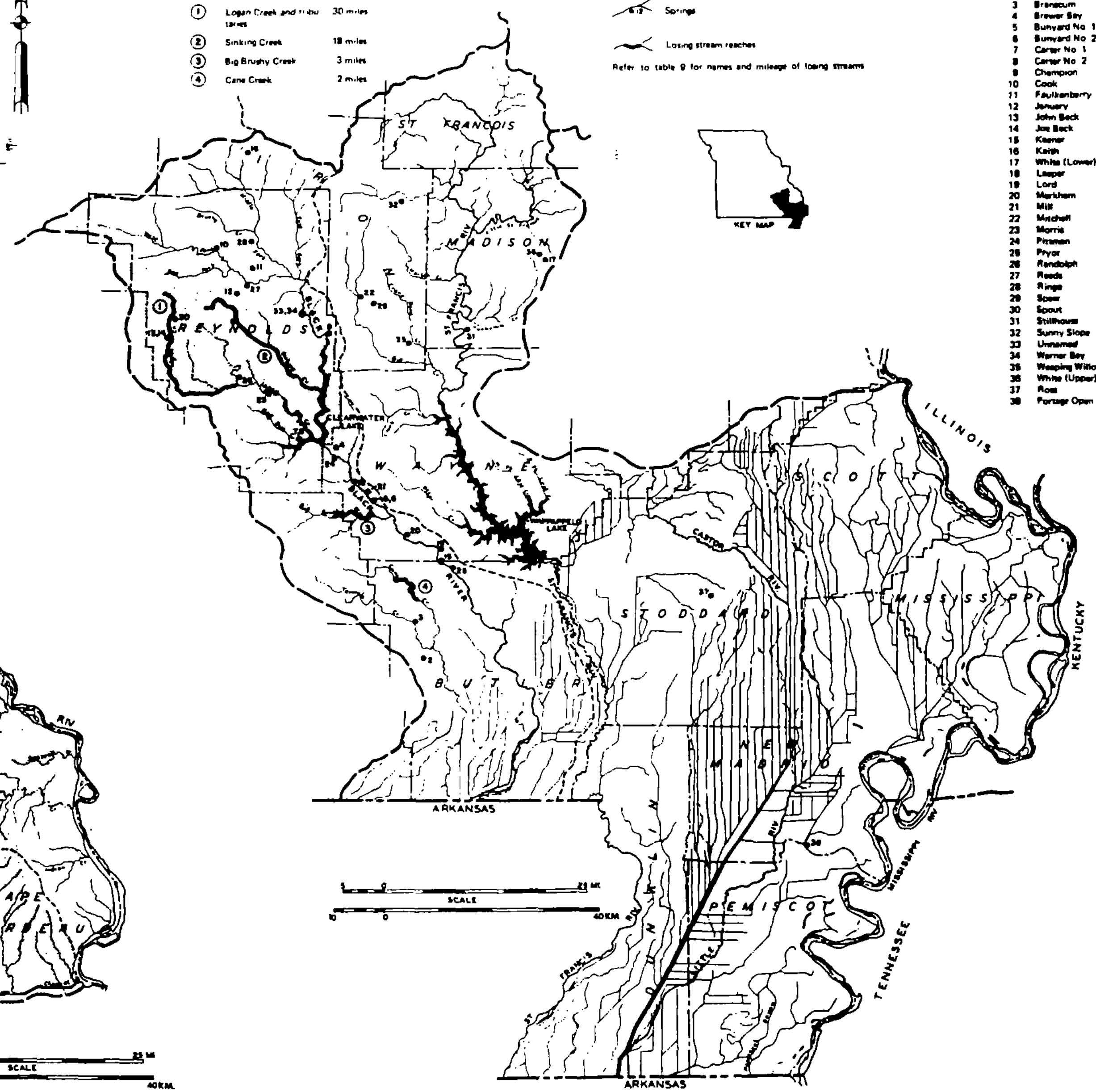


Table 8 – SPRINGS

Map K – Lower Mississippi-Black River Basin

No	Spring	County
1	Amsden	Reynolds
2	Bay	Butler
3	Branscum	Butler
4	Brewer Bay	Wayne
5	Bunyard No 1	Wayne
6	Bunyard No 2	Wayne
7	Carter No 1	Reynolds
8	Carter No 2	Reynolds
9	Champion	Reynolds
10	Cook	Reynolds
11	Faulkenberry	Reynolds
12	January	Reynolds
13	John Beck	Reynolds
14	Joe Beck	Reynolds
15	Keener	Wayne
16	Keith	Iron
17	White (Lower)	Madison
18	Leeper	Wayne
19	Lord	Wayne
20	Markham	Wayne
21	Mill	Wayne
22	Mitchell	Iron
23	Morris	Reynolds
24	Pitman	Wayne
25	Pryor	Butler
26	Randolph	Reynolds
27	Reeds	Reynolds
28	Ringo	Reynolds
29	Spear	Iron
30	Spout	Reynolds
31	Stillhouse	Madison
32	Sunny Slope	Iron
33	Unnamed	Reynolds
34	Warner Bay	Reynolds
35	Weeping Willow	Iron
36	White (Upper)	Madison
37	Ross	Stoddard
38	Portage Open Bay	New Madrid

Figure 58 - GROUNDWATER QUALITY

Total Dissolved Solids (parts per million)

Unusable (greater than 10,000)

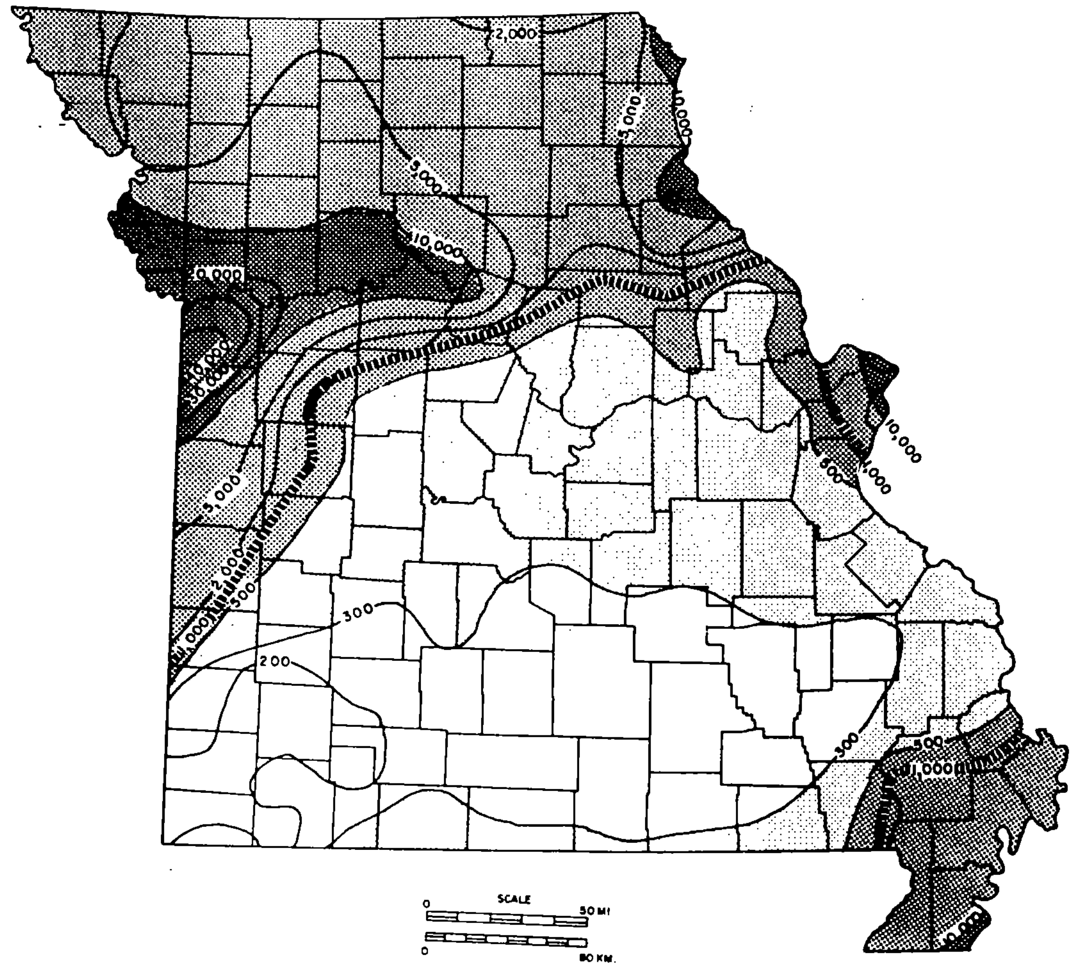
Poor and very poor (500-10,000)

Good (300-499)

Excellent (fewer than 300)

Fresh-water-mineralized-water contact zone

Source: (16) p. 89



GROUNDWATER QUALITY

A line defined by the isoline of 1000 parts per million total dissolved solids defines the fresh-water-mineralized-water contact zone, or interface, which divides Missouri into two basic regions with respect to bedrock groundwater quality (fig. 58). Areas where total dissolved solids in groundwater are less than 1000 parts per million are classified in the fresh-water province; those where they exceed 1000 parts per million are classified in the mineralized-water province.

Fresh-Groundwater Province — Groundwater quality in this province of Missouri in bedrock zones is considered good to excellent; the entire Ozarks is included within it. Two types of fresh water are identified: "hard" calcium-magnesium-bicarbonate water in the dolomites of the Cambrian and Ordovician rocks and "hard" calcium-bicarbonate water in the Mississippian limestones of the Springfield Plateau (24), p. 292. Water with more than 120 parts per million of calcium carbonate is considered "hard" (16), p. 26. Shallow aquifers in the Ozarks are subject to pollution because of the relative ease of movement of water and/or pollutants through permeable rock materials.

Mineralized-Groundwater Province. — Total dissolved solids in groundwater in bedrock aquifers in this province may exceed 50,000 parts per million. Groundwater from Pennsylvanian bedrock aquifers and from deeper bedrock aquifers in northern Missouri is often the most mineralized and is generally unfit for most purposes, including stock watering, irrigation, and municipal supplies. The quality of groundwater from glacial drift overlying the Pennsylvanian bedrock is quite variable; it is "hard," generally high in iron, locally high in dissolved solids, and varies from a calcium-bicarbonate type to a sodium-sulfate type. Because of the poor quality of such groundwater, water supplies are drawn from wells in alluvium in buried drift-filled preglacial valleys (see fig. 42) and modern valleys, or from surface streams and reservoirs (see figs. 51 and 59).

Increasing pumpage of fresh groundwater near the fresh-water-mineralized-water contact zone, e.g., around Mexico (Audrain County), may cause mineralized water from the deeper aquifers to invade the fresh-water zones.

The quality of groundwater in the southeastern lowlands varies according to aquifer and well depth. River-deposited alluvial sands and gravels yield good-quality, but "hard," water, which locally has high concentrations of iron. Abundant supplies of good-quality, but "hard," water also come from the deeper Tertiary sands. Below them, Cretaceous sands yield soft water (less than 60 parts per million of calcium carbonate) of low iron content. Flowing artesian conditions are common in some stratigraphic units in the southeastern lowlands. High artesian heads are produced by steep hydraulic gradients, dipping aquifer units, and confining clay beds.

Further information on groundwater quality is available from the Missouri Department of Natural Resources, Division of Geology and Land Survey, Rolla, the Department of Natural Resources, Division of Environmental Quality, Jefferson City; and the Water Resources Division of the U.S. Geological Survey, Rolla.

Table 20 – MUNICIPAL WATER SUPPLY FACILITIES

Map I – Meramec River Basin

1	Belle	Maries	Well
2	Bismark	St Francois	Well
3	Bland	Gasconade	Well
4	Bonne Terre	St Francois	Well
5	Bourbon	Crawford	Well
6	Cuba	Crawford	Well
7	Eureka	St Louis	Well
8	Flat River	St Francois	Well
9	Gerald	Franklin	Well
10	Hillsboro	Jefferson	Well
11	Irondale	Washington	Well
12	Leadwood	St Francois	Well
13	Leasburg	Crawford	Well
14	Oak Grove Village	Franklin	Well
15	Owensville	Gasconade	Well
16	Pacific	Franklin	Well
17	Potosi	Washington	Well
18		Phelps	Well
19		Gasconade	Well
20		Dent	Well
21		Franklin	Well
22	[illegible]	Phelps	Well
23	Steelville	Crawford	Well
24	Sullivan	Franklin	Well
25	—	—	—
26	Union	Franklin	Rv & Wl
27	Valley Park	St Louis	Well
28	Viburnum	Iron	Well
29	Cedar Hills Lake	Jefferson	Well

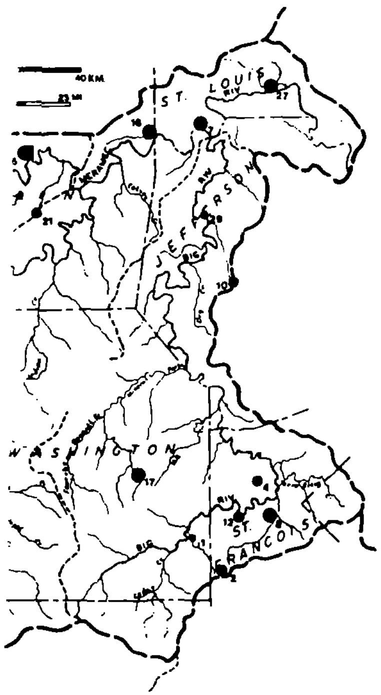


Figure 82J – UPPER MISSISSIPPI RIVER BASIN BELOW ST. LOUIS

(Does not include rural water districts, subdivisions, trailer parks, and certain institutions)

Plant capacity in million gallons per day

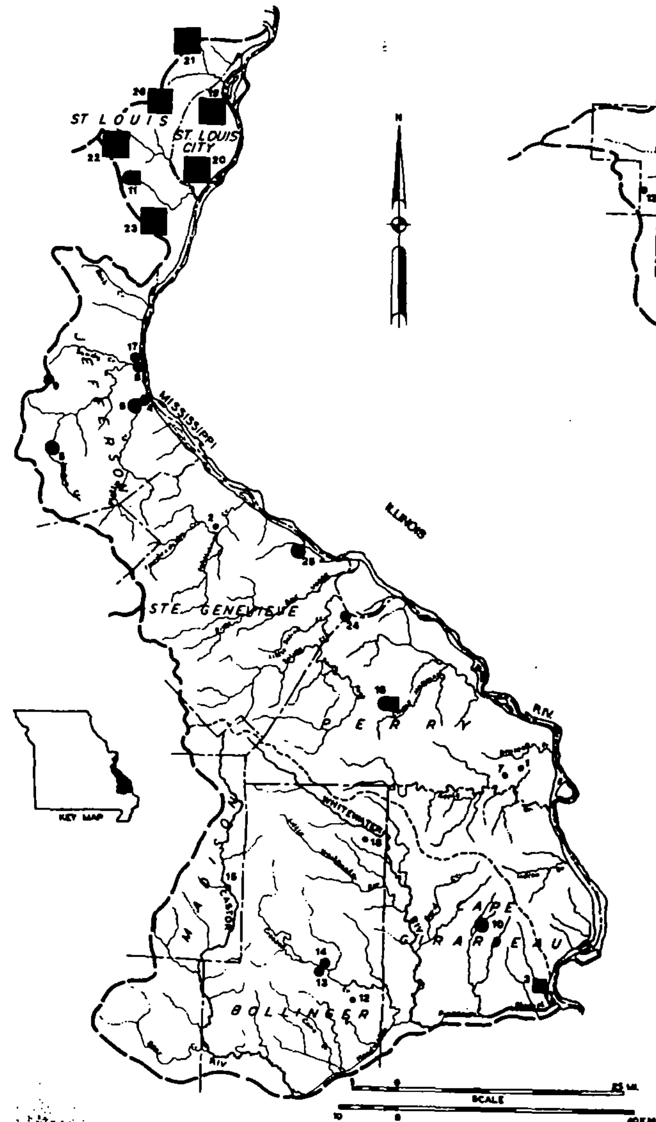
	less than 0.250	0.250-.999	1.000-9.999	10.000+
Well				
River				
Reservoir, lake, impoundment				
Well and river				
Reservoir and spring				
Spring				

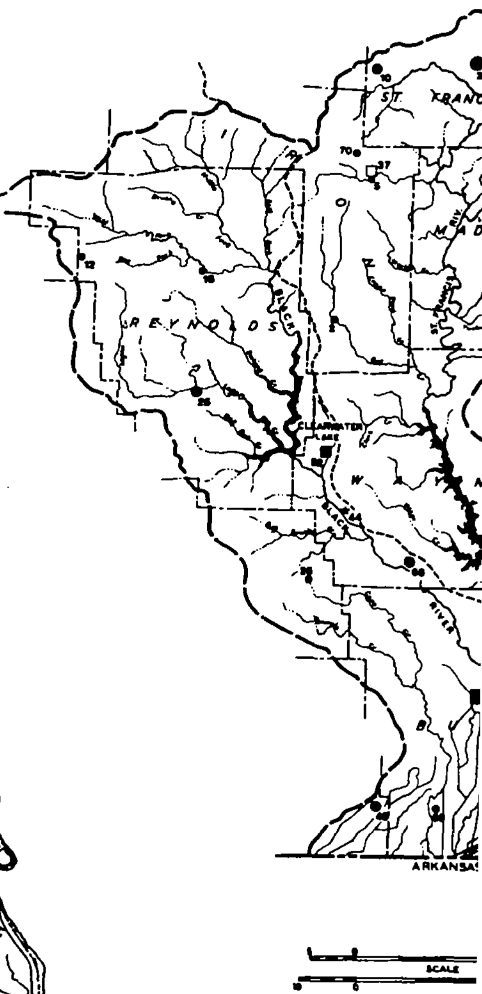
Refer to table 20 for the name, county, and type of municipal water supply facilities

Table 20 – MUNICIPAL WATER SUPPLY FACILITIES

Map J – Upper Mississippi River Basin Below St. Louis

1	Altenburg	Perry	Well
2	Bloomsdale	Ste. Genevieve	Well
3	Cape Girardeau	Cape Girardeau	Rv & Wl
4	Crystal City	Jefferson	Well
5	De Soto	Jefferson	Well
6	Festus	Jefferson	Well
7	Frohna	Perry	Well
8	Herculaneum	Jefferson	Well
9	Hillsboro	Jefferson	Well
10	Jackson	Cape Girardeau	Well
11	Kirkwood	St. Louis	Rv & Wl
12	Leopold	Bollinger	Well
13	Lutesville	Bollinger	Well
14	Marble Hill	Bollinger	Well
15	Marquand	Madison	Well
16	Perryville	Perry	Rv & Wl
17	Pevely	Jefferson	Well
18	Sedgewickville	Bollinger	Well
19	St. Louis	City-Chain of Rocks	River
20	St. Louis	City-Howard Bend (Intake in St. Louis County)	River
21	St. Louis	County	River
22	St. Louis	County	River
23	St. Louis	County	River
24	St. Marys	Ste. Genevieve	Well
25	Ste. Genevieve	Ste. Genevieve	Well
26	St. Louis	County	River





Missouri Department of Natural Resources

State Parks

1 Meramec
2 St. Francois
3 Washington
5 Castlewood
6 St. Joe
7 Robertsville (under development)
8 Onondaga Cave
9 Vilander Bluff

• State Historic Sites

4 Dillard Mill
10 Missouri Mines

Federally Administered Areas

Mark Twain National Forest
Potosi Salem Ranger District

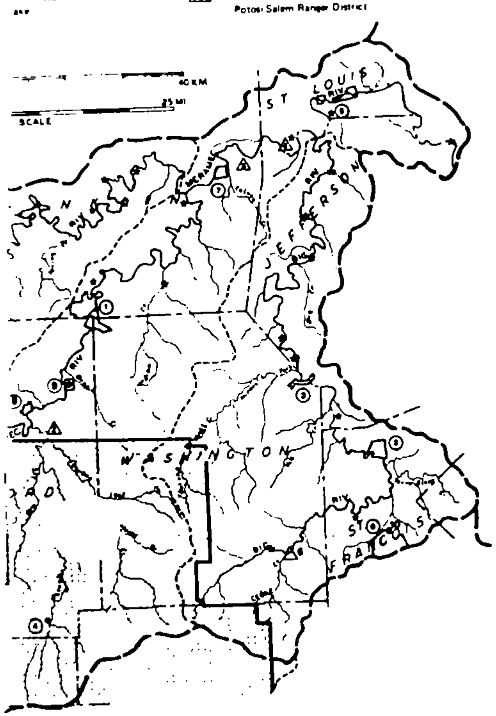


Figure 90J – UPPER MISSISSIPPI RIVER BASIN BELOW ST. LOUIS

Missouri Department of Conservation

Wildlife Management Areas

1 Lake Girardeau
2 Hickory Canyons

Public Fishing Lakes

		Water Acreage
1	Perry County Community Lake	101
2	Lake Girardeau	162

Missouri Department of Natural Resources

State Parks

1 Hawn
2 Trail of Tears
3 Mastodon
4 Victoria Glade (under development)

• State Historic Sites

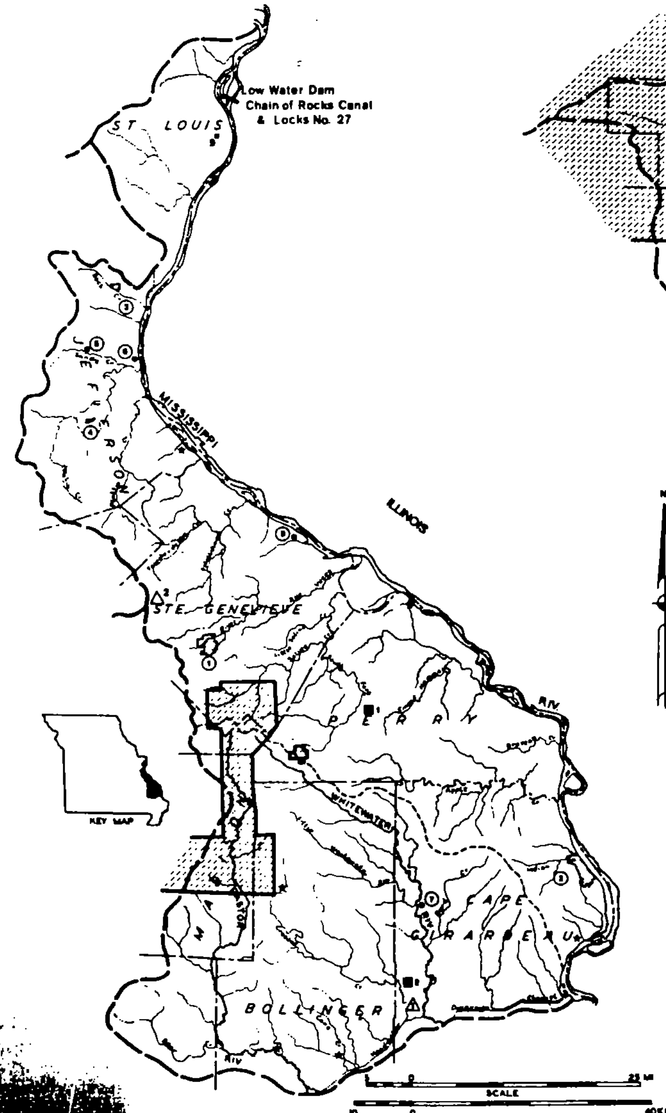
5 Sandy Creek Covered Bridge
6 Governor Dunklin Grave
7 Bollinger Mill – Burfordville Covered Bridge
8 Felix Valle Home
9 Scott Joplin Home

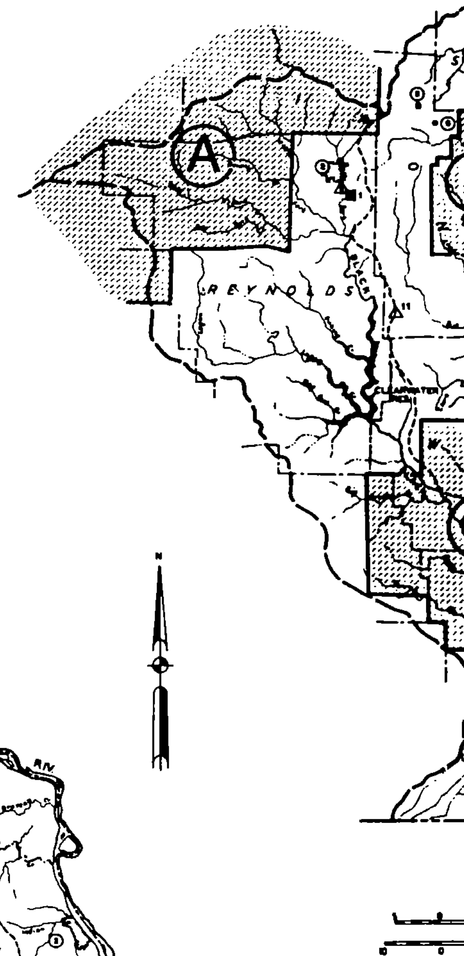
Federally Administered Areas

Mark Twain National Forest
Fredericktown Ranger District

U.S. Army Corps of Engineers Locks and Dams

Low Water Dam Chain of Rocks Canal & Locks No. 27





HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 16

Illinois Environmental Protection Agency · P. O. B...

217/785-4787

March 24, 1992

RECEIVED
'92 MAR 26 AM 10 36
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Mr. Edwin D. Knight, Chief
Superfund Section
Division of Environmental Quality
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

Dear Mr. Knight:

This letter is in response to your February 27, 1992 request for assistance in locating drinking water wells and surface water intakes along or near the Mississippi River near St. Louis on the Illinois side of the river.

I have enclosed a map showing the location of one surface water intake and numerous wells which exist within the area of interest. Also enclosed are the facility wells reports for several community water supply well fields located near the Mississippi River in the Counties of Madison, St. Clair, and Monroe.

There do not appear to be any community public water supply wells in the area of interest. The wells located on the map were located by the Southwestern Illinois Planning Commission in June of 1988. The legend describing well types is located on the map. This map may not contain all drinking water wells in the area of interest. Additional well location data is available from the Illinois State Water Survey and the Illinois State Geological Survey. I have included the addresses for the surveys as follows:

Illinois State Water Survey
2204 Griffith Drive
Champaign, IL 61820

Illinois State Geological Survey
615 E. Peabody Drive
Champaign, IL 61820

I trust this responds to your needs. If you have further questions or need assistance please contact Bill Buscher or me at 217/785-4787

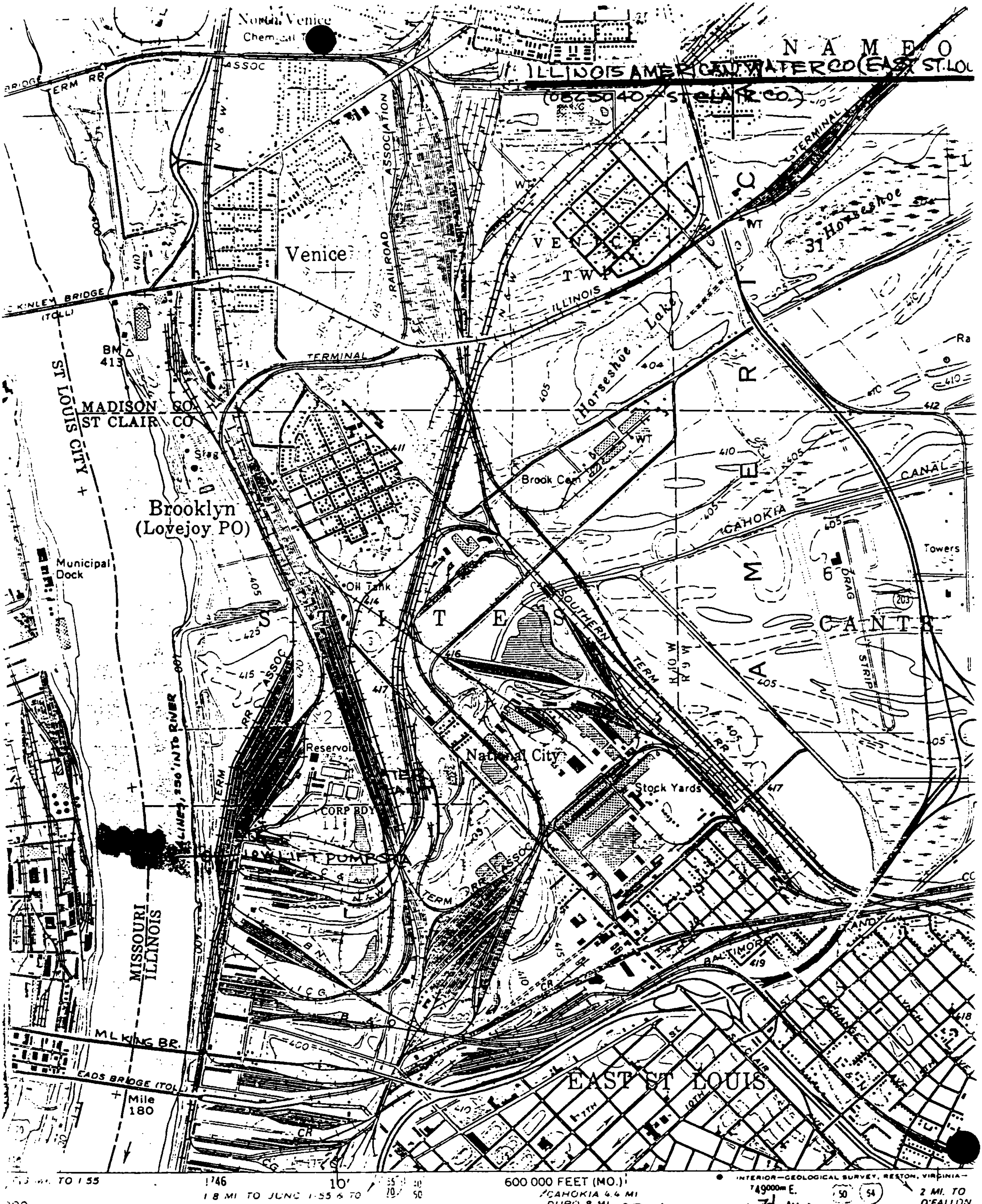
Sincerely,

Richard P. Cobb
Acting Manager
Groundwater Section
Public Water Supplies

RPC:WEB:jmm/35N/5

Enclosure

cc: Roger Selburg



GRANITE CITY-7½ MIN
(1954 REV 1982)

NEW MAP
FOR YOUR OFFICIAL FILES.
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STATE GEOLOGICAL SURVEY, CHAMPAIGN, IL

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt

PA SCORE

Census of Missouri Public Water Systems 1991

Missouri Department of Natural Resources
Division of Environmental Quality

MISSOURI DEPARTMENT OF NATURAL RESOURCES
Public Drinking Water Program
P.O. Box 176
Jefferson City, MO 65102
(314) 751-5331

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CITY WATER SUPPLY FACILITIES

PUBLIC WATER SUPPLY	LVL	YEAR BEGAN	OWN	PEOPLE SERVED	SERVICE CONNECTIONS	SOURCE OF SUPPLY	SUPPLY CAPACITY M G D	AVE. DLY CONSUMP M G D.	WATER TREATMENT	FINISHED WATER STORAGE
SPRINGFIELD	A	1883	M	143,200	53,296	THREE LAKES, ONE SPRING, JAMES RIVER, 10 WELLS	61.8000	22.5000	FP-1S 2A 2C 3C 6P 9C 9U 4A 4R 4S 3C 12A	16.5250
ST ANN						ST LOUIS CO WATER CO			SEE ST LOUIS CO WATER COMPANY	
ST CATHARINE						CHARITON-LINN CO PWSD #3-W			SEE BROOKFIELD	
ST CHARLES	A	1965	M	42,000	13,000	SEVEN WELLS (U)	10.0000	4.4000	IH-1T 3C 2C 6T 6P 6S 9V 9B 2E 3C 5C 4R 4S 7Q	
ST CLAIR	E	1932	M	3,970	1,209	FIVE WELLS (C)	.5230	.3400	NONE	.8000
ST ELIZABETH	E	1969	M	290	90	ONE WELL (C)	.1000	.0250	NONE	.1000
ST GEORGE						ST LOUIS CO WATER CO			SEE ST LOUIS CO WATER COMPANY	
ST JAMES	D	1924	M	3,330	1,384	THREE WELLS (C)	2.0000	.5000	12T	.3500
ST JOHN						ST LOUIS CO WATER CO			SEE ST LOUIS CO WATER COMPANY	
ST JOSEPH	A	1881	I	77,000	27,000	MISSOURI RIVER	20.8000	13.5000	C-2X 9P 3C 9U 2C 6P 9U 9U 4R 4S 3C	13.9000
ST LOUIS CITY	X	1831	M	437,500	138,000	MISSOURI AND MISSISSIPPI RIVERS	440.0000	152.0000	FHP-	20.0000
ST LOUIS CITY-CHAIN OF RO	A	1831	M			MISSISSIPPI RIVER	320.0000	106.0000	FHP-3C 9P 9U 2C 6B 9M 9U 7Q 2F 3C 6B 9M 9U 12A 4R 4S 7C 3C	
ST LOUIS CITY-HOWARD BEND	A	1929	M			MISSOURI RIVER	120.0000	46.0000	FHP-3C 9P 9U 2C 6B 9M 9U 7G 3C 2F 6B 9M 9U 12A 4R 4S 7Q 3C	
ST LOUIS CO WATER CO	X	1902	I	1,000,000	265,000	MERAMEC AND MISSOURI RIVERS	313.0000	121.7000	HP-	97.1000
ST LOUIS CO WATER CO-CENT	A	1906	I			MISSOURI RIVER	165.0000	87.0000	HP-2E 2C 9P 9M 2C 2F 12A 6T 6P 9U 2F 11C 6P 3C 9U 2E 4R 4S 7G	
ST LOUIS CO WATER CO-MERA	A	1973	I			MERAMEC RIVER	24.0000	10.5000	HP-3C 6J 3C 11C 2T 6J 2C 6P 6T 6S 9V 9M 9U 2F 11C 6P 3C 12A 5C 9M 9U 3C 4R 4S 3C 7C	

CITY WATER SUPPLY FACILITIES

PUBLIC WATER SUPPLY	LVL	YEAR BEGAN	OWN	PEOPLE SERVED	SERVICE CONNECTIONS	SOURCE OF SUPPLY	SUPPLY CAPACITY M.G.D.	AVE. DLY. CONSUMP M.G.D.	WATER TREATMENT	FINISHED WATER STORAGE
ST LOUIS CO WATER CO-NORT	A	1955	I			MISSOURI RIVER	76.0000	17.5000	HP-2E 6J 2C 6T 9P 9M 9U 12A 11C 2F 2C 6B 6H 6P 3C 9M 9U 2F 11C 6T 6P 3C 9M 9U 4A 4R 4S 3C 7C	
ST LOUIS CO WATER CO-SOUT	A	1956	I			MERAMEC RIVER	40.0000	21.0000	HP-2E 6J 2C 2T 9P 9M 9U 2C 2F 12A 11C 6T 6P 3C 9M 9U 11C 2F 6P 3C 9M 9U 7C 2F 6T 2E 3C 4R 4A 4S 3C 7C	
ST MARTINS						COLE CO PWSD #3			SEE COLE CO PWSD -3	
ST MARYS	D	1937	M	545	244	ONE WELL (U)	.3240	.0280	IH-1T 9C 2P 3C 4P 4S 4Z	.1000
ST PETERS	A	1960	M	28,800	11,000	FIVE WELLS (C)	14 8000	3.8570	FIHP-1T 3C 2C 5C 6T 9V 4A 4S 12A	2.5000
ST ROBERT	D	1960	M	1,800	2,000	THREE WELLS (C)	.9000	.2100	F-12T	.3750
ST THOMAS						COLE CO PWSD #5			SEE COLE CO PWSD -5	
STANBERRY	D	1883	M	670	670	THREE WELLS (U)	.3000	.2080	FP-3C 12T	.1380
STARK CITY						NEWTON CO PWSD #1			SEE NEWTON CO PWSD -1	
STE GENEVIEVE	C	1934	M	4,500	1,878	THREE WELLS (U)	1.8360	.7500	FH-4Z 12T	.6400
STEELE	C	1938	M	2,570	1,050	TWO WELLS (U)	.5760	.5290	FIH-1T 3C 2C 6B 9U 12T 4R 4S	.1750
STEELVILLE	E	1934	M	1,470	850	TWO WELLS (C)	.9900	.2000	NONE	.4000
STELLA	E	1967	M	230	110	TWO WELLS (C)	.4032	.0220	NONE	.1000
STEWARTSVILLE	E	1954	M	832	338	DEKALB CO PWSD #1	.5000	.0500	SEE DEKALB PWSD 1 AND ST JOSEPH WATER	.5000
STOCKDALE						CLAY CO PWSD #4			SEE LIBERTY	
STOCKTON	D	1936	M	1,579	900	TWO WELLS (C)	.8640	1850	F-12T	.1550
STOTTS CITY	D	1930	M	231	113	ONE WELL (C)	.2300	.0200	P-3H	.0376
STOUTLAND						LACLEDE CO PWSD #2			SEE LACLEDE CO PWSD -2	
STOVER	E	1939	M	1,050	420	TWO WELLS (C)	.2000	.0870	NONE	0500

PUBLIC WATER SUPPLY INTAKE LOCATIONS

NAME OF SUPPLY	NAME OF STREAM	COUNTY	1/4 SECTION	SECTION	TWP	RANGE	RIVER MILE
MISSOURI RIVER							
St. Joseph	Missouri River	Buchanan	NESW	31	58N	35W	452.2
Kansas City	Missouri River	Clay	SE	10	50N	33W	370.5
Lexington	Missouri River	Lafayette	NW	33	51N	27W	322.5
Higginsville	Missouri River	Lafayette	--	24	51N	26W	306.0
Glasgow	Missouri River	Howard	--	8	51N	17W	227.0
Boonville	Missouri River	Cooper	NE	34	48N	17W	197.0
Jefferson City	Missouri River	Cole	--	6	44N	11W	144.0
St. Louis (Howard Bend)	Missouri River	St. Louis	--	--	45N	4E	37.0
St. Louis (Central Plant)	Missouri River	St. Louis	--	--	45N	4E	36.0
St. Charles	Missouri River	St. Charles	--	--	46N	5E	29.0
St. Louis County (North Plant)	Missouri River	St. Louis	--	--	47N	6E	20.5
MISSISSIPPI RIVER							
Canton	Mississippi River	Lewis	--	36	62N	6W	342.3
Hannibal	Mississippi River	Marion	--	20	57N	4W	310.0
Louisiana	Mississippi River	Pike	--	18	54N	1W	282.8
St. Louis (Chain of Rocks)	Mississippi River	St. Louis	--	35	47N	7E	190.5
Cape Girardeau	Mississippi river	Cape Girardeau	--	28	31N	14E	54.3
MERAMEC RIVER							
Kirkwood	Meramec River	St. Louis	--	--	44N	5E	Approx. 1.2

FILE: Hubert Wheeler St◌ School

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: December 27, 1993

TO: Julie Bloss, Environmental Specialist
Site Evaluation Unit, Superfund Section
Hazardous Waste Program

FROM: Kristine Davidson, Environmental Specialist
Site Evaluation Unit, Superfund Section
Hazardous Waste Program

SUBJECT: Hubert Wheeler State School Preliminary Assessment

This memo is to discuss attributes of handicapped and developmentally disabled children which may be of interest when looking at sites under the HRS (Hazard Ranking System). The Hubert Wheeler State School serves the needs of severely developmentally disabled children, many of whom have serious physical handicaps. That the school's play yard is a potentially hazardous site concerns me for several reasons not usually addressed in the HRS.

First, my background in this subject is as follows:

> I was employed for two years as a ward supervisor in a home for mentally retarded women, from 1972 through 1974.
>
> During 1976-1975, I taught school in the Orchard Farm School District.
>
> From 1982 through 1987, I worked for the Departments of Social Service and Mental Health on interdisciplinary teams certifying and inspecting residential and day care programs for the mentally retarded/developmentally disabled. My duties included assessing client records and care plans, as well as direct observation of client developmental levels and suitability of physical plants in relation to their individual needs and capabilities. During that time, I attended many training sessions on the care and treatment of developmentally disabled populations.

Please keep in mind when investigating this site that the children who attend this school differ greatly in behavior and abilities than those children attending mainstream elementary schools. Many of these students have severe mobility limitations, and may require wheelchairs, walkers or braces. These children would be more likely to be sitting on the ground for long periods of time if not moved by staff. Another factor to consider is pica. Pica is the craving or tendency to eat non-food items. This was always a problem in the residential and day programs I inspected, much more so than with mainstream students. Rocks, metal parts, paper, grass and dirt were commonly ingested items.

During the site visit in October 1993, I noticed that many of the students were physically disabled. It has been my experience that the developmentally disabled/physically handicapped populations also have more frequent and severe health problems than would be expected in a mainstream school. I would expect that part of this is due to their inability to communicate their symptoms, but this is conjecture. Keep in mind that some of the students may have autoimmune diseases or cardio/pulmonary/renal involvement which may make them much more susceptible to environmental influences.

KD:so

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

TELEPHONE OR CONFERENCE RECORD

FILE: Hubert Wheeler State School

DATE: December 28, 1993

TELEPHONE:

Incoming ( )
Outgoing (X)

CONFERENCE:

Field ( )
Office (X)

SUBJECT: Drinking Water Intakes Along the Mississippi River

PERSONS INVOLVED:

NAME	REPRESENTING
Ms. Julie A. Bloss	MDNR/HWP/Superfund
Mr. Jack Baker	MDNR/St. Louis Regional Office

SUMMARY OF CONVERSATION:

I called Mr. Baker to verify that Chain of Rocks was the only drinking water intake in St. Louis located along the Mississippi River. Mr. Baker thought that the Rush Island Union Electric intake, 6 miles south of Crystal City, was the next downstream drinking water intake along the Mississippi. He also noted that Crystal City is supplied by a Raney well, which may be susceptible to surface water contamination. After the Union Electric intake, the next downstream intake he was aware of was in Cape Girardeau.

Julie A. Bloss

Julie A. Bloss
Environmental Specialist

JAB:so

c: Ms. Kristine Davidson, Superfund

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

TELEPHONE OR CONFERENCE RECORD

FILE: Hubert Wheeler State School

DATE: December 28, 1993

TELEPHONE:

Incoming ( )
Outgoing (X)

CONFERENCE:

Field ( )
Office (X)

SUBJECT: Possible Sources of Coal Tar Contamination At The Hubert Wheeler State School

PERSONS INVOLVED:

NAME	REPRESENTING
Julie A. Bloss	MDNR/HWP/Superfund
Professor Allen Hatheway	UMR/Geological Engineering (314) 341-4777 (314) 341-6935 (fax)

SUMMARY OF CONVERSATION:

I called Dr. Hatheway to inquire about potential sources of coal tar contamination near the Hubert Wheeler State School. Dr. Hatheway was aware of two former manufactured gas plants in the area: Carondolet Coke Company and the Laclede Shrewsbury Plant.

Dr. Hatheway said that the Carondolet Coke Company was previously owned by the Great Lakes Carbon Company and, prior to that, the Laclede Gas Company. Ownership of the site dates back to 1910. The site is currently owned by the City of St. Louis. Mr. Eric Klipsch has been assigned to the site and is collecting data to determine the threat parameters. I told Dr. Hatheway that I thought that the state would be interested in Mr. Klipsch's findings. Dr. Hatheway suggested that I contact Mr. Klipsch.

Julie A. Bloss

Julie A. Bloss
Environmental Specialist

JAB:so

File: Hubert Wheeler State School

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: January 10, 1994

TO: Hubert Wheeler State School
Superfund file

FROM: Julie A. Bloss, Environmental Specialist JAB
Site Evaluation Unit, Superfund Section
Hazardous Waste Program

SUBJECT: Notes Made by Superfund staff, October 7, 1993 Site Visit

The following is a compilation of notes and observations made by the Superfund staff during the site visit of October 9, 1993:

1. The tar bubbles up during the hot summer months. Cracks and fissures are visible in the asphalt surface. Stained areas of asphalt were observed and photographed. It is not known whether the stained areas are the result of efforts to patch the asphalt or whether the stained areas are from the bubbling tar.

2. Two drums were observed to be present on-site in a trash dumpster. Photographs of these drums were taken. The Geotechnology label on one reads: Hubert Wheeler School, composite soils, August 24, 1993.

3. According to the janitor, the school overlies an old city dump. The playground was built about 15 years ago.

4. Mr. John Woody is the custodian for the school. Mr. Louis Buryn is the school building principal. Mr. Kevin Hultberg is the school groundskeeper.

5. The site is located at a local high point in St. Louis. It is not located in a floodplain.

JAB:so

HUBERT WHEELER STATE SCHOOL
'PA/SI' REFERENCE 23

File: PA/SI FY92 Corresp

JOHN ASHCROFT
Governor

G. TRACY MEHAN III
Director

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MEMORANDUM

RECEIVED
'91 NOV 6 AM 11 20

DATE: November 1, 1991

TO: John Madras, Environmental Specialist, Superfund Section, Hazardous Waste Program

FROM: R. Eck, Regional Director, St. Louis Regional Office

SUBJECT: Public Drinking Water Sources in the Vicinity of PA/SI Sites

This memo is in response to your request of the SLRO Public Drinking Water Unit Chief for information on wells near the PA/SI sites of Central Plating (CP) and [redacted].

There are no permitted public drinking water wells within a four (4) mile radius of either site. There are no permitted public drinking water surface water intakes within 15 miles downstream on the Missouri side.

In the future, please direct all such requests to me. Since the regional office has no PA/SI funding this fiscal year, I have to make a decision on who is going to do the work and what funding source is going to pay for the activity.

I would recommend that all "special requests" be sent to the regions from the program director. This would facilitate the program directors knowledge of the amount and extent of requests being made. Circumstances may arise where the special requests will interfere with other agreed upon program commitments and/or SEA. A special request from the director would also establish his concurrence for the higher priority in performance of the request.

RSPE/sh

c: Nick DiPasquale, Director, HWP
John Young, Deputy Director, DEQ
Roger Randolph, Deputy Director, DEQ

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HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 24

DRAFT

TOXICOLOGICAL PROFILE FOR POLYCYCLIC AROMATIC HYDROCARBONS

Prepared by:

Clement International Corporation
Under Contract No. 205-88-0608

Prepared for:

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

October 1993

1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about polycyclic aromatic hydrocarbons (PAHs) and to emphasize the human health effects that may result from exposure to them. The Environmental Protection Agency (EPA) has identified 1,350 hazardous waste sites as the most serious in the nation. These sites comprise the "National Priorities List" (NPL): Those sites which are targeted for long-term federal cleanup activities. PAHs have been found in at least 585 of the sites on the NPL. However, the number of NPL sites evaluated for PAHs is not known. As EPA evaluates more sites, the number of sites at which PAHs are found may increase. This information is important because exposure to PAHs may cause harmful health effects and because these sites are potential or actual sources of human exposure to PAHs.

When a substance is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. This release does not always lead to exposure. You can be exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking substances containing the substance or by skin contact with it.

If you are exposed to substances such as PAHs, many factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, gender, nutritional status, family traits, life-style, and state of health.

1.1 WHAT ARE POLYCYCLIC AROMATIC HYDROCARBONS?

PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. PAHs can either be man-made or occur naturally. Most of these chemicals have no known use except for research purposes. A few of the PAHs are used in medicines and to make dyes, plastics, and pesticides, while others are contained in asphalt used in road construction. They are found throughout the environment in the air, water, and soil. There are more than 100 different PAH compounds. Although the health effects of the individual PAHs are not exactly alike, the following 17 PAHs are considered as a group in this profile:

- acenaphthene
- acenaphthylene
- anthracene
- benz(a)anthracene
- benzo(a)pyrene
- benzo(e)pyrene
- benzo(b)fluoranthene

- benzo(g,h,i)perylene
- benzo(j)fluoranthene
- benzo(k)fluoranthene
- chrysene
- dibenz(a,h)anthracene
- fluoranthene
- fluorene
- indeno(1,2,3-c,d)pyrene
- phenanthrene
- pyrene

These 17 PAHs were chosen to be included in this profile because (1) more information is available on these than on the others; (2) they are more harmful than many or most of the others; (3) there is a greater chance that you will be exposed to these PAHs than to the others; and (4) they were the ones most frequently identified at NPL hazardous waste sites.

As pure chemicals, PAHs generally exist as colorless, white, or pale yellow-green solids. They can have a faint, pleasant odor. Most PAHs do not occur alone in the environment (including those found at hazardous waste sites). They are found as parts of complex mixtures of chemicals. They can occur in the air either attached to dust particles or as solids in soil or sediment. They can also be found in substances such as crude oil, coal, coal tar pitch, creosote, and road and roofing tar.

More information can be found on the chemical and physical properties of PAHs in Chapter 3 and on their use and disposal in Chapter 4.

1.2 WHAT HAPPENS TO POLYCYCLIC AROMATIC HYDROCARBONS WHEN THEY ENTER THE ENVIRONMENT?

PAHs enter the environment largely as releases to air from volcanoes, forest fires, residential wood burning, and automobile and truck exhausts. They can also enter surface water through discharges from industrial plants and waste water treatment plants, and they can be released to soils at hazardous waste sites. The movement of PAHs in the environment depends on properties like their water solubility, vapor pressure, and molecular weight. PAHs in general do not easily dissolve in water. They are present in air as vapors or stuck to the surfaces of small solid particles and can travel long distances before they are removed through washout in rainfall or particle settling. From surface waters, some PAHs can evaporate into the atmosphere, but most will stick to solid particles and settle to the bottoms of rivers or lakes. In soils, the compounds are most likely to stick tightly to particles. Some PAHs can evaporate from surface soils to air. Certain PAHs in soils can also contaminate underground water. The PAH content of plants and animals living on the land or in water can be many times higher than the content of PAHs in soil or water. PAHs can break down to less short-lived products by reacting with sunlight and other chemicals in the air, generally over a period of days to weeks. Breakdown in soil and water generally takes weeks to months and is due mostly to the actions of microorganisms. For more information on what happens to PAHs in the environment see Chapter 5.

1.3 HOW MIGHT I BE EXPOSED TO POLYCYCLIC AROMATIC HYDROCARBONS?

PAHs are present throughout the environment, and you may be exposed to these substances at home, while outside, or at the workplace. Typically, you will not be exposed to an individual PAH alone, but to a mixture of PAHs.

In the environment, you are most likely exposed to PAH vapors or PAHs that are attached to dust and other particles in the air. Sources include cigarette smoke, vehicle exhausts, asphalt roads, coal, coal tar, wild fires, agricultural burning, residential wood burning, and hazardous waste sites. Background levels of some representative PAHs in the air are reported to be 0.02–1.2 nanograms per cubic meter (ng/m^3; a nanogram is one-millionth of a milligram) in rural areas and 0.15–19.3 ng/m^3 in urban areas. You may be exposed to PAHs in soil near areas where coal, wood, gasoline, or other products have been burned. You may be exposed to PAHs in the soil on or near hazardous waste sites, such as former manufactured-gas sites and wood-preserving facilities. PAHs have been found in some drinking water supplies in the United States. Background levels of PAHs in drinking water range from 4 to 24 nanograms per liter (ng/L).

In the home, PAHs are present in tobacco smoke, smoke from home burning of wood, creosote-treated wood products, cereals, grains, flour, bread, vegetables, fruits, meat, processed or pickled foods, and contaminated cow's milk or human breast milk. Food grown in contaminated soil or air may also contain PAHs. Cooking meat or other food at high temperatures, which happens during grilling or charring, increases the amount of PAHs in the food. The level of PAHs in the typical U.S. diet is less than 2 parts of total PAHs per billion parts of food (ppb), or less than 2 micrograms per kilogram of food (μg/kg; a microgram is one-thousandth of a milligram).

The primary sources of exposure to PAHs for most of the U.S. population are inhalation of the compounds in tobacco smoke, wood smoke, and ambient air, and ingestion of PAHs in foods. For some people, the primary exposure to PAHs occurs in the workplace. PAHs have been found in coal tar production plants, coking plants, bitumen and asphalt production plants, coal-gasification sites, smoke houses, aluminum production plants, coal tarring activities, and municipal trash incinerators. PAHs have also been found in other facilities where petroleum, petroleum products, or coal are used or where wood, cellulose, corn, or oil are burned. Populations living near waste sites containing PAHs may be exposed through contact with contaminated air, water, and soil. For more information on human exposure to PAHs see Chapter 5.

1.4 HOW CAN POLYCYCLIC AROMATIC HYDROCARBONS ENTER AND LEAVE MY BODY?

PAHs can enter your body through your lungs when you breathe air that contains them (usually stuck to particles or dust). This is one of the routes of exposure for people living near hazardous waste sites. However, it is not known how rapidly or completely uptake by the lungs occurs. Drinking water and swallowing food, soil, or dust particles that contain PAHs are other routes for these chemicals to enter your body, but uptake is generally slow when PAHs are swallowed. Under normal conditions of environmental exposure, PAHs could rapidly enter your body if your skin comes into contact with soil that contains high levels of PAHs (this could occur near a hazardous waste site) or with used crankcase oil or other products (such as creosote) that contain PAHs. The rate at which PAHs enter your body by ingestion or through the skin is increased when they are present in certain oily mixtures; other oily mixtures decrease absorption into your body.

PAHs can enter all the tissues of your body that contain fat and tend to be stored mostly in your kidneys, liver, and fat, with smaller amounts in your spleen, adrenal glands, and ovaries. PAHs are changed by all tissues in the body into many different substances. Some of these substances are more harmful and some are less harmful than the original PAHs. Results from animal studies show that PAHs do not tend to be stored in your body for a long time. Most PAHs that enter the body leave within a few days, primarily in the feces and urine. More information on how PAHs enter and leave your body can be found in Chapters 2 and 6.

1.5 HOW CAN POLYCYCLIC AROMATIC HYDROCARBONS AFFECT MY HEALTH?

PAHs can be harmful to your health. Several of the PAHs, including benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene, have caused tumors in laboratory animals when they breathed them in the air, when they ate them, or when they had long periods of skin contact with them. Reports in humans show that individuals exposed by breathing or skin contact for long periods to mixtures that contain PAHs and other compounds can also develop cancer.

Mice fed high levels of benzo(a)pyrene during pregnancy had difficulty reproducing and so did their offspring. The offspring from pregnant mice fed benzo(a)pyrene also showed other harmful effects, such as birth defects and decreased body weight. Similar effects could occur in humans, but we have no information to show that these effects do occur.

Studies in animals have also shown that PAHs can cause harmful effects on skin, body fluids, and the body's system for fighting disease after both short- and long-term exposure. These effects have not been reported in humans.

The Department of Health and Human Services (DHHS) has determined that benzo(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene may reasonably be anticipated to be carcinogens. The International Agency for Research on Cancer (IARC) has determined the following: benzo(a)anthracene and benzo(a)pyrene are probably carcinogenic to humans; benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-c,d)pyrene are possibly carcinogenic to humans; and anthracene, benzo(g,h,i)perylene, benzo(e)pyrene, chrysene, fluoranthene, fluorene, phenanthrene, and pyrene are not classifiable as to their carcinogenicity to humans. EPA has determined that benz(a)anthracene, benz(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene are probable human carcinogens and that acenaphthylene, anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene are not classifiable as to human carcinogenicity. Acenaphthene has not been classified for carcinogenic effects by the DHHS, IARC, or EPA. More information on the health effects associated with exposure to PAHs can be found in Chapter 2.

1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO POLYCYCLIC AROMATIC HYDROCARBONS?

In your body, PAHs are changed into chemicals that can attach to substances within the body. The presence of PAHs attached to these substances can then be measured in body tissues or blood after exposure to PAHs. PAHs or their breakdown products can also be measured in urine, blood, or body tissues. Although these tests can show that you have been exposed to PAHs, these tests cannot be used to predict if any health effects will occur or to determine the extent of your exposure to the PAHs. It is not known how effective or informative the tests are after exposure is discontinued. These tests to identify PAHs or their products are not routinely available at a doctor's office because they require special equipment for detecting these chemicals. More information on tests used to determine PAHs in your body is presented in Chapters 2 and 6.

1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government has set regulations to protect individuals from the possible health effects of eating, drinking, or breathing PAHs. EPA has suggested that taking into your body each day the following amounts of individual PAHs is not likely to cause any significant (noncancer) harmful health effects: 0.3 milligrams (mg) of anthracene, 0.06 mg of acenaphthene, 0.04 mg of fluoranthene, 0.04 mg of fluorene, and 0.03 mg of pyrene per kilogram (kg) of your body weight (one kilogram is equal to 2.2 pounds).

Based on data on benzo(a)pyrene, the federal government has developed regulatory standards and guidelines to protect individuals from the potential health effects of PAHs in drinking water. EPA has provided estimates of levels of total cancer-causing PAHs in lakes and streams associated with various risks of developing cancer in humans. If the following amounts of individual PAHs are released to the environment, EPA must be notified: 1 pound of benzo(b)fluoranthene, benzo(a)pyrene, or dibenz(a,h)anthracene; 10 pounds of benzo(a)anthracene; 100 pounds of acenaphthene, chrysene, fluoranthene, or indeno(1,2,3-c,d)pyrene; or 5,000 pounds of acenaphthylene, anthracene, benzo(k)fluoranthene, benzo(g,h,i)perylene, fluorene, phenanthrene, or pyrene.

PAHs are generally not produced commercially in the United States except as research chemicals. However, PAHs are found in coal, coal tar, and in the creosote oils and pitches formed from the distillation of coal tars. The National Institute for Occupational Safety and Health (NIOSH) concluded that occupational exposure to coal products can increase the risk of lung and skin cancer in workers and established a recommended occupational exposure limit (REL-TWA) for coal tar products of 0.1 milligram of PAHs per cubic meter of air (0.1 mg/m^3) for a 10-hour work day, 40-hour work week. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends an occupational exposure limit for coal tar products of 0.2 mg/m^3 for an 8-hour work day, 40-hour work week. The Occupational Safety and Health Administration (OSHA) has established a legally enforceable limit of 0.2 mg/m^3 averaged over an 8-hour exposure period.

More information on rules and standards for exposure to PAHs can be found in Chapter 7.

1.8 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

> Agency for Toxic Substances and Disease Registry
> Division of Toxicology
> 1600 Clifton Road NE, E-29
> Atlanta, Georgia 30333
> (404) 639-6000

This agency can also provide you with information on the location of occupational and environmental health clinics. These clinics specialize in the recognition, evaluation, and treatment of illness resulting from exposure to hazardous substances.

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

TELEPHONE OR CONFERENCE RECORD

FILE: Hubert Wheeler State School

DATE: January 7, 1994

TELEPHONE:

Incoming ( )
Outgoing (X)

CONFERENCE:

Field ( )
Office (X)

SUBJECT: Number of Staff Members at Hubert Wheeler State School

PERSONS INVOLVED:

NAME	REPRESENTING
Julie A. Bloss	MDNR/HWP/Superfund
Louis Buryn	Wheeler School (314) 645-4712

SUMMARY OF CONVERSATION:

I called Mr. Buryn to inquire how many staff members were currently employed at the Hubert Wheeler State School. Mr. Buryn said that there are currently 60 staff members.

FINAL RESULTS:

This information will be used in the Preliminary Assessment (PA) report.

Julie A. Bloss

Julie A. Bloss
Environmental Specialist

JAB:so

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 26

U.S. DEPARTMENT OF COMMERCE

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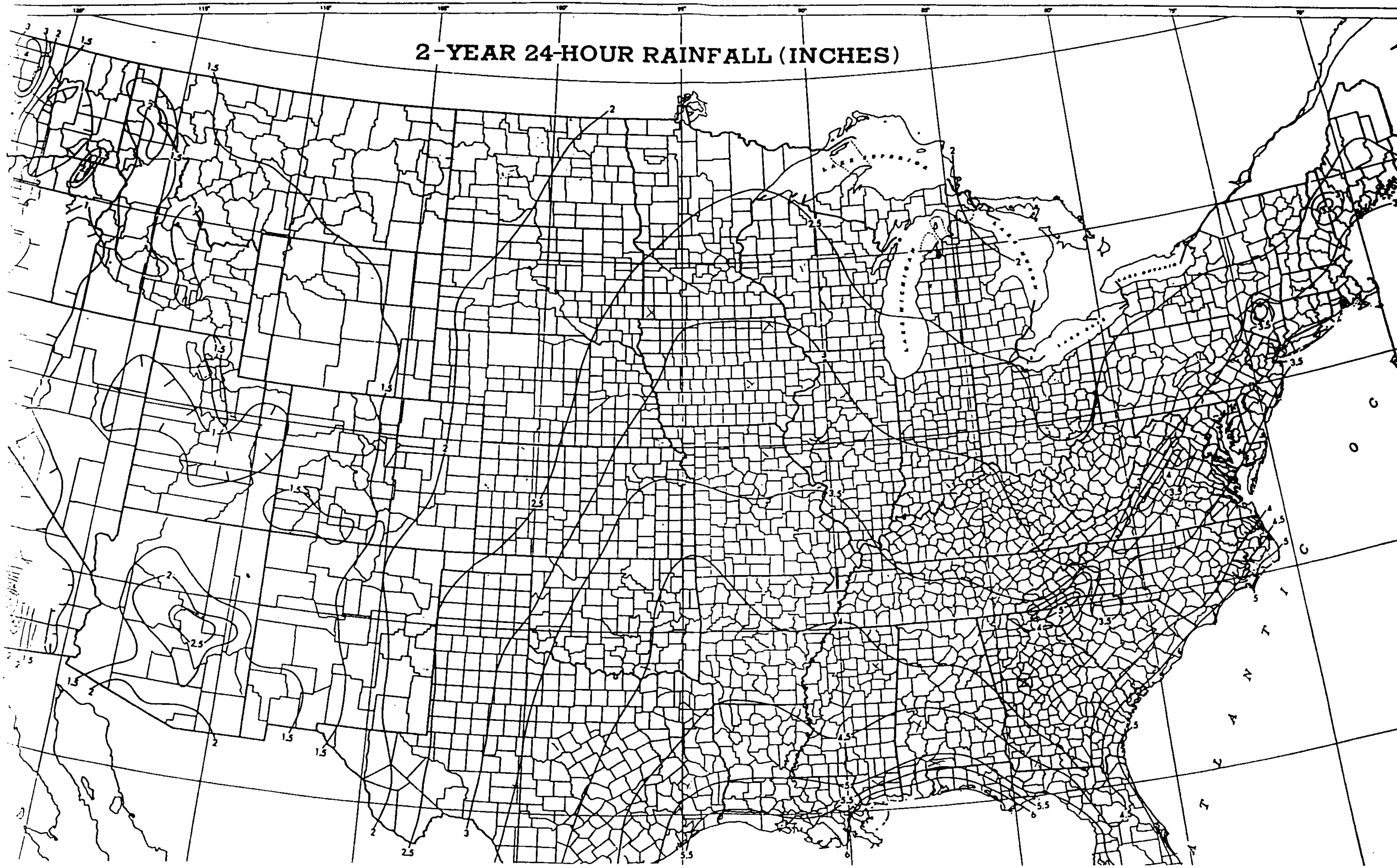
2-YEAR 24-HOUR RAINFALL (INCHES)

MISSOURI DEPARTMENT OF HEALTH

Mel Carnahan
Governor

Coleen Kivlahan, M.D., M.S.P.H.
Director

P.O. Box 570, Jefferson City, MO 65102-0570 • 314-751-6400 • FAX 314-751-6010

HUBERT WHEELER STATE SCHOOL
PA/SI REFERENCE 27

December 16, 1993

RECEIVED
93 DEC 17 AM 9 10
HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Mr. Edwin D. Knight, Chief
Department of Natural Resources
Superfund Section
P.O. Box 176
Jefferson City, MO 65102-0176

Dear Mr. Knight:

The Missouri Department of Health (MDOH) has reviewed the information regarding hazardous substances underlying the Hubert Wheeler State School in St. Louis City. This review focused on the present uses of the site and potential human exposure to soil contaminants.

The Hubert Wheeler State School is located at 5707 Wilson Avenue, St. Louis, Missouri, 63110. This site is located south of Interstate 44, in a mixed commercial and residential area. A site assessment was conducted subsequent to discovery of a black tar-like material resembling coal tar occasionally oozing to the surface. This site is presently used as a play area for students attending Hubert Wheeler State School. Subsequent soil sampling revealed several contaminants that could pose an immediate threat to children playing in the area if the contaminants are present at the surface. Plate 1 identifies the play area surface as asphalt and the walkway surface to the school buildings as concrete. Even though the play area has been covered with asphalt, the report indicates that occasionally the tar-like material has been observed to seep up through this asphalt surface. In addition, the surfaces of the areas between the buildings and the play area are not identified. If the surfaces are topped with soil or grass, these areas should be considered as potential exposure sites and access to them, as well as the play area, should be restricted.

The MDOH's Any-Use Soil Level (ASL) is the maximum concentration of a chemical that is acceptable in the soil at a residential setting. The following is a list of contaminants that exceed MDOH's ASLs. All levels are in parts per million.

Chemical	Highest Level	Any-Use Soil Level (ASL)
Lead	303.0	240
Lead	308.0	240
Lead	338.0	240
Benzo(a)Anthracene	45.0	0.44
Chrysene	54.0	0.44
Benzo(b)Flouranthene	62.0	0.44
Benzo(k)Fluoranthene	29.0	0.44
Benzo(a)Pyrene	41.0	0.44
Dibenzo(a,h,)Anthracene	6.0	0.44

Health effects of lead poisoning in children range from adverse effects on the central nervous system at low blood lead levels to coma, convulsions, and even death at extremely high blood lead levels. Polynuclear aromatic hydrocarbons generally cause acute health effects such as skin and eye irritation. The chronic health effect of PAHs is its potential to cause cancer of the skin, lungs, and bladder in humans.

Table 3 of the Hubert Wheel report contains a listing of estimated soil action levels in parts per million. The Missouri Department of Health's ASLs differ from 5 of the 6 listed. Fluoranthene's estimated value in this report is 3,200, and MDOH's ASL is 2,300. The action level for pyrene is listed as 1,600 in the report. Our calculated value is 1,700. MDOH's ASLs for chrysene, benzo(b)fluoranthene, and benzo(a)pyrene are 0.44 for each one.

Until testing is done to prove that any accessible surfaces are not potential contamination sources (surface sample results are below the ASL), the Missouri Department of Health strongly recommends that access to this area be limited to personnel directly involved in assessment and remediation procedures.

Thank you for the opportunity to review and comment on this document. If you have any questions regarding this review, please feel free to contact Ms. Joule Stevenson at (314) 751-6102.

Sincerely,

Daryl W. Roberts
Chief
Bureau of Environmental Epidemiology

DWR:JS

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF THE DIRECTOR

P.O. Box 176 Jefferson City, MO 65102-0176 (314) 751-4422

FAX (314) 751-7627

JAN - 3 1994

Mr. Robert Bartman, Commissioner
Division of Secondary
and Elementary Education
P.O. Box 480
Jefferson City, MO 65102

RE: Hubert Wheeler State School, 5707 Wilson Avenue
St. Louis, MO 65110

Dear Mr. Bartman:

The MDNR (Missouri Department of Natural Resources) has received sampling results from the subsurface assessment conducted for the Division of Elementary and Secondary Education at the Hubert Wheeler State School in St. Louis. Sampling results indicate lead and several carcinogenic PAHs (polynuclear aromatic hydrocarbons) were detected in the soil underlying the asphalt at levels that exceed the ASLs (Any-Use Soil Levels) proposed by MDOH (Missouri Department of Health). MDOH's comments with regard to this contamination are enclosed.

The asphalt is used as a playground by the students of the school. Cracks and fissures are visible in the asphalt surface, potentially exposing the children to both soil and air contamination.

In concurrence with MDOH, MDNR strongly recommends that access to asphalt playground and other areas of known contamination be restricted to personnel involved in the hazardous substance assessment and remediation projects.

Very truly yours,

DEPARTMENT OF NATURAL RESOURCES

David A. Shorr
Director

DAS:jbo

Enclosure

c: Mr. Daryl Roberts, MDOH